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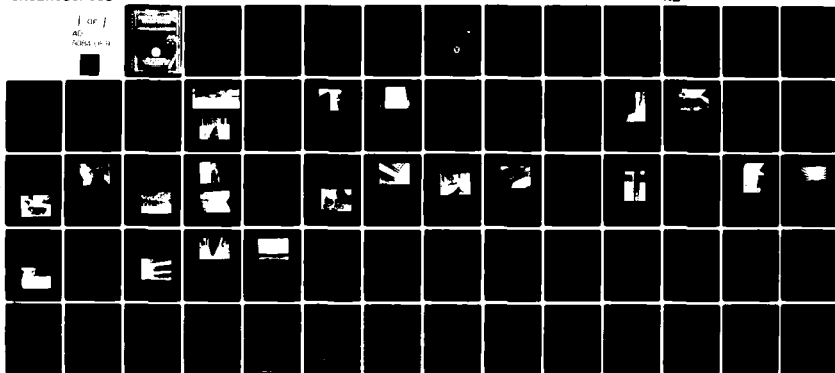
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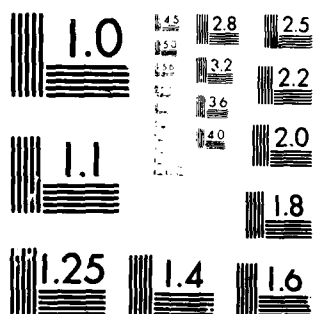


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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) This report presents the findings and recommendations for the 1979 inspection of the Chesapeake City Bridge (Route designation, U.S. Route 213) which crosses the Chesapeake and Delaware Canal. Technical information is given on the condition of the main and approach piers, access stairways, abutments, paint, bridge deck and the general site. It is reported that the Chesapeake City Bridge is in good structural condition with the most important items of maintenance and repair relating to cleaning and painting metalwork under the joints and girder spans.		

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# BRIDGE INSPECTION REPORT NO. 11B

## CHESAPEAKE CITY BRIDGE

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PREPARED BY  
HOWARD NEEDLES TAMMEN & BERGENDOFF



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DEPARTMENT OF THE ARMY  
PHILADELPHIA DISTRICT, CORPS OF ENGINEERS  
CUSTOM HOUSE - 2D & CHESTNUT STREETS  
PHILADELPHIA, PENNSYLVANIA 19106

DECEMBER 1979

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## HOWARD NEEDLES TAMMEN & BERGENDOFF

December 10, 1979

Col. James G. Ton, District Engineer  
U. S. Army Corps of Engineers  
Custom House - 2nd & Chestnut Streets  
Philadelphia, Pennsylvania 19106

Re: Chesapeake City Bridge - Inspection Report 11B  
Contract No. DACW61-79-D-0019, Work Order No. 1

Dear Col. Ton:

Presented herein is our 1979 report of Inspection and Evaluation of the Chesapeake City Bridge, crossing the Chesapeake & Delaware Canal in Delaware. The inspection and report were done in accordance with the requirements of Contract No. DACW61-79-D-0019, Work Order No. 1.

The inspection revealed the Chesapeake City Bridge, except for the defects discussed in the report, to be in good condition. The report described in detail the inspection findings and lists the items of maintenance and repair which we recommend for the structure. Particular emphasis should be placed upon cleaning and painting the steelwork, under the expansion bearings.

This report is based upon inspections at the times and in the manner described. The nature of the undertaking does not permit assurance that there may not be latent or hidden defects in the condition of the members or lack of uniformity in the quality of the materials used or occurrences subsequent to the inspections made. No responsibility can, therefore, be assumed for lack of integrity of the structure from unpredictable causes or those beyond the scope of this report.

Architects Engineers Planners

1345 Avenue of the Americas, New York, New York 10019, 212 757-4000

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Col. James G. Ton, District Engineer  
December 10, 1979

Page Two

The cooperation and assistance provided by personnel of the U. S. Army  
Corps of Engineers during the inspection and preparation of this report  
are sincerely appreciated.

Very truly yours,

HOWARD NEEDLES TAMMEN & BERGENDOFF

*F. H. Sterbenz*  
F. H. Sterbenz  
Associate

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Enclosures

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BRIDGE INSPECTION REPORT NO. 11B

1979

CHESAPEAKE CITY BRIDGE

over

C & D CANAL, DELAWARE

for

Department of the Army

Philadelphia District, Corps of Engineers

Philadelphia, Pennsylvania

by

HOWARD NEEDLES TAMMEN & BERGENDOFF  
Consulting Engineers  
New York, New York

December, 1979

LIST OF BRIDGE INSPECTION REPORTS  
PREPARED DURING 1979

- 11A - St. Georges Bridge
- 11B - Chesapeake City Bridge
- 11C - Delaware City Bridge

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BRIDGE INSPECTION REPORT NO. 11B

1979 INSPECTION REPORT

CHESAPEAKE CITY BRIDGE OVER THE CHESAPEAKE

AND DELAWARE CANAL IN MARYLAND

for the

DEPARTMENT OF THE ARMY, U. S. CORPS OF ENGINEERS

INTRODUCTION

The findings and recommendations for the 1979 inspection of the Chesapeake City Bridge (Route designation, U.S. Route 213) which crosses the Chesapeake and Delaware Canal was undertaken for the Department of the Army, U. S. Corps of Engineers by Howard Needles Tammen & Bergendoff (HNTB) and are submitted herein. A location map is presented in Drawing 1-0.

The bridge substructure and superstructure were visually inspected as described hereinafter. The field inspection was made during the period of October 19 through October 26, 1979 by E. W. Krause, P.E., and C. S. Ross. The rules and provisions outlined in the AASHTO Manual for Maintenance Inspection of Bridges, 1978, and the National Bridge Inspection Standards were used as guides in performing the inspection. This report is the fifth in a series covering inspections made on this bridge in 1969, 1971, 1973 and 1975. This bridge was analyzed for rating in 1973.

The "Snooper" truck, "Cherry picker" truck, motorized maintenance traveler located beneath the road level of the tied arch

and the boat used during the inspection were supplied by the Corps of Engineers and operated by their personnel, under the direction of the Superintendent, Chesapeake City, Maryland.

Caldwell's Diving Co., Inc. of Toms River, New Jersey, was employed on October 10 and 11, 1979, to inspect the underwater portions of Piers 1S and 1N and to perform a hydrographic survey.

Enterprise Flasher, Inc., of Wilmington, Delaware was employed to provide traffic control.

Reference material used by our personnel included past bridge inspection reports, and "as-built" contract and rehabilitation drawings. This data supplemented by the current inspection findings, field measurements and photographs pertaining to the bridge's current condition, provided the information required to complete this report and the structure inventory and appraisal form attached hereto.

1.01 GENERAL INFORMATION

The Chesapeake City Bridge was designed by Parsons, Brinkerhoff, Hogan and MacDonald, New York City, and was constructed during the period 1947-48. The bridge is a fixed, high level, two lane highway structure. It consists of a 540 foot steel tied arch main span, flanked on the north and south sides by a series of 14 and 18 riveted plate girder spans, respectively, ranging in length from approximately 80 feet to 136 feet. The total length of the structure between abutments is approximately 3,955 feet. Vertical clearance above mean high water is 135 feet.

Center-to-center of trusses of the arch span is 33 feet 6 inches. A motorized maintenance traveler is provided under the main span. The approach girders, spaced at 27 feet-4 inches, are supported on the ends of tapered floorbeams, cantilevered beyond the pier top. The center-to-center distance between floorbeam bearings is 11 feet. The roadway width between the 10-inch high concrete curbs is 25 feet. The deck which was replaced in 1978, is a reinforced concrete slab constructed on permanent metal deck forms, except for the center bay which was constructed using removable forms. Nominal depth of the deck slab in the approach spans and the arch span is 8-1/2 inches. The concrete sidewalk on the east side of the roadway is 4 feet wide. Access to the sidewalk is provided by staircases cast integrally with Piers 10S and 10N. Bridge railings are steel. There are no roadway lights on the bridge, but lights illuminating the sidewalk are located in the adjacent railing.

All piers and abutments are constructed of reinforced concrete. The abutments and piers are designed with pile supported footings, but some piers are indicated on the "as-built" drawings as having spread footings. The two main piers, which are located in the Chesapeake and Delaware Canal, are faced with granite in the tidal zone.



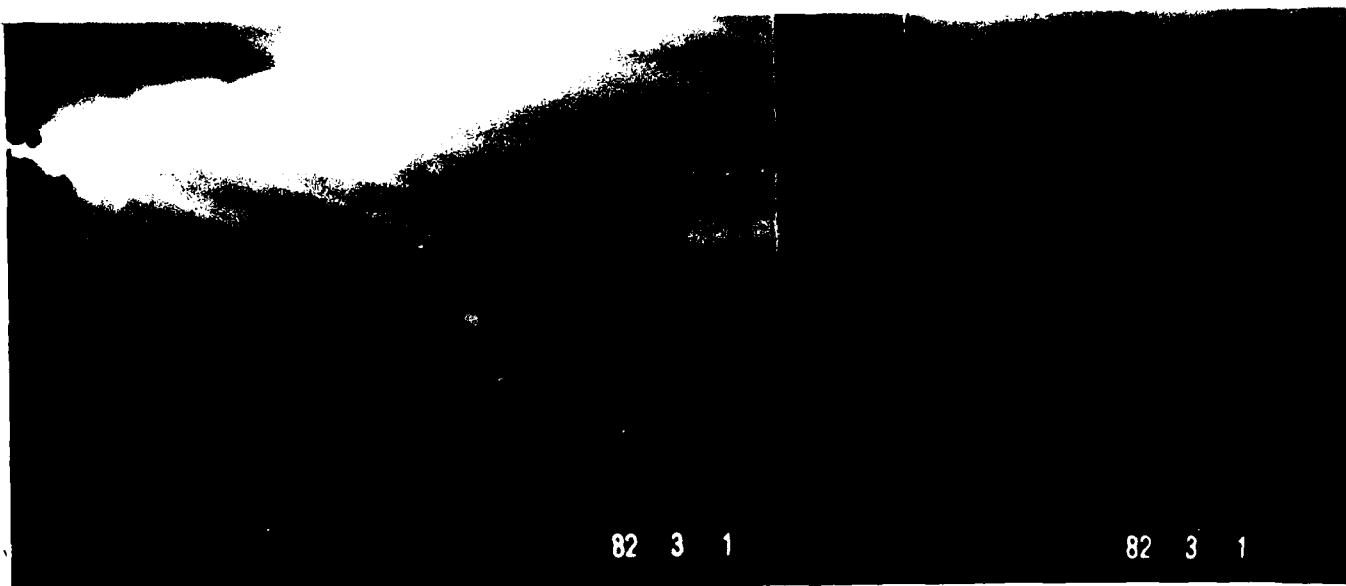
Construction of a new deck, including a sidewalk, slope paving under the abutments and modifications of structural steel members and drainage, were completed in 1978 under a rehabilitation contract.

The structure was designed under AASHO 1935 Specifications for live load of H20. The bridge is posted for a 55 mph speed limit on the north and south approaches, but there is no posted load limit. A general structure information sign is located at each end of the structure.

General views of the bridge are shown in Photographs 1 and 2. A general plan and elevation of the structure, with pier and panel point designations referred to in this report are shown on Drawing 1-1.

A number of items of work have been performed by Government Forces since the 1975 inspection. A chain link fence has been erected outside both bridge rails for the entire length of the bridge; interior of the tie girders cleaned, caulked and painted; collision damaged railings repaired and spot painted; and roadway drains flushed.

No major structural problems were observed during the inspection although many items are in need of repair. Description of the condition of elements of the bridge and recommendations for repairing certain items are described in the following report. A list of these items are tabulated at the end of the report for reference. Colored photographs are included to illustrate items discussed in the report. The structure inventory and appraisal sheet is included at the end of the report.



Photograph 1 - Chesapeake City Bridge - Elevation of tied arch span and portions of the the north and south approaches looking west.



Photograph 2 - Roadway view, looking south through arch span.

1.02 INSPECTION PROCEDURE

Substructure

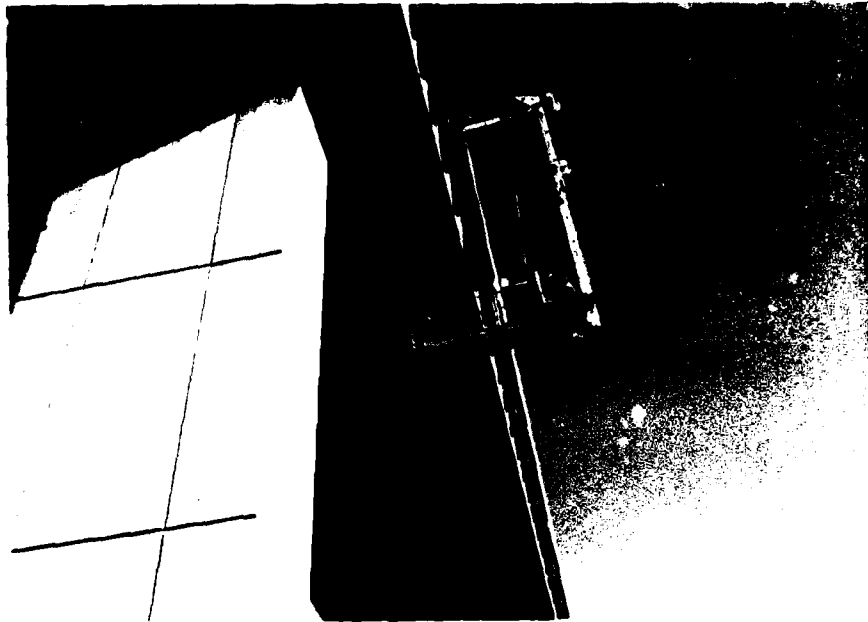
The abutments and piers were observed from a "Snooper" truck, a "Cherry picker" truck, a maintenance traveler, a boat, and from accessible vantage points on the ground. The underwater portions of Piers 1N and 1S were inspected by a diver. A hydrographic survey of the canal bottom was made during the inspection for comparison with the channel elevations recorded during previous inspections.

Superstructure

The bottom portion of the railings, edge of roadway deck, steel work, and deck on the underside of the approach spans were inspected from a "Snooper" truck, a "Cherry picker" truck and from pier tops. (See Photograph 3.) The tied arch span above the roadway level was inspected from a "Cherry picker" truck and from the inspection walkway on the top chord. The tied arch below roadway level was observed from the motorized maintenance traveler and from the top and interior of the tie girders.

The top surfaces of the deck, sidewalk, curbs, joints and the top portion of the railings were inspected from the roadway.

Rocker leans were measured and recorded for comparison with past readings and for future reference.



Photograph 3 - HNTB personnel inspecting underside of girder span from a "Snooper" truck.

#### SUBSTRUCTURE

##### Main Piers

###### a) Pier 1S

There are vertical cracks with efflorescent staining on the east and west faces of the both pier shafts. (See Photograph 4.)

There is a 2'-0" x 8" x 2" spall on the southeast corner of the east pier shaft, and an 18" x 8" x 4" and a 12" x 6" x 2" spall on the northeast corner of the west pier shaft. (See Photograph 4.) These spalls are located just above the granite-concrete interface.

The ladder extending from the superstructure to the top of the pier cap ends on a small platform cantilevered from the pier cap. It was noted that there is no railing around the platform.



Photograph 4 - Pier 1S - Spall on the northeast corner of the east shaft. Efflorescent staining on the east face of the shaft is visible.

b) Pier 1N

There are vertical cracks with efflorescent staining on the east and west faces of the west pier shaft.

Recommendations

For the surface concrete spalls, cleaning the spalled surfaces and patching with epoxy and mortar is recommended.

The vertical cracks in the pier shafts should be kept under observation.

In the interest of safety, erection of a railing around the platform, at the base of the ladder leading to the top of Pier 1S, is recommended.

Approach Piers

The condition of the pier concrete is good. Most piers exhibit hairline vertical cracks, some exhibiting efflorescent or rust stains.

Unplugged construction form-tie holes were noted at random locations in the sides of pier struts and pier caps. Grout plugs placed in the form-tie holes on Piers 12S and 14S are loose and can be removed by hand. There are homes and a school adjacent to these piers.

Several approach piers have spalls. The location and nature of these deficiencies are outlined hereinafter.

Pier 6S: There is an 8" x 6" x 2" spall on the northwest corner of the pier shaft.

Pier 4N: There is a 14" x 14" x 1" spall on the southwest corner of the pier shaft.

Piers 7N and 10N: There are minor surface spalls on the pier shafts.

Recommendations

It is recommended that the spalls on Piers 6S and 4S be cleaned and patched with epoxy mortar.

The hairline vertical cracks in the pier stems should be kept under observation.

The loose grout plugs in the form tie-holes on Piers 12S and 14S should be removed because they are potentially dangerous to vehicles or pedestrians passing below or adjacent to them.

The unplugged form-tie holes, which are of no significance, but are unsightly should be filled with epoxy and mortar when other work is being performed at these pier locations.

Access Stairways (at Piers 10N and 10S)

Access stairways are attached to the shafts of Piers 10N and 10S. These staircases provide access to the sidewalk located on the east side of the bridge. The portion of the stairways from the ground level to the pier cap is constructed of concrete and the portion above the pier cap is constructed of steel. The railings are steel.

There is a 6" x 6" x 1" spall with exposed reinforcing steel on the 3rd landing of the stairway at Pier 10S and a 6" x 8" x 1" spall with exposed reinforcing steel at the 2nd landing on Pier 10S.

The steel portion of the stairways is in good condition although there are rust stains at the junction of the risers and treads of the steel portion of the stairway at Pier 10S.

The railings on Pier 10S are in good condition. Most of the handrails on Pier 10N are broken or missing.

The sidewalk at the base of Pier 10N has cracked and settled; it is a potential tripping hazard.

There is an accumulation of sand on the stairway at Pier 10N.

Recommendations

For the surface concrete spalls, cleaning the spalled surfaces and patching with epoxy and mortar is recommended.

The broken and missing handrails on Pier 10N should be repaired or replaced.

The cracked and settled sidewalk at the base of Pier 10N should be replaced.

Periodic cleaning of both stairways is recommended to avoid the accumulation of sand.

Gaps between the riser and treads of the steel portion of the stairway at Pier 10S should be cleaned and sealed.

Abutments

a) South Abutment

The backwall exhibits hairline vertical cracks at about three feet spacing.

The slope paving is in very good condition.

b) North Abutment

Four pieces of steel were noted wedged between the backwall and the concrete deck. (See Photograph 5.) This metal may restrict the movement of the superstructure or damage the backwall or the concrete deck.

The slope paving is in very good condition. (See Photograph 6.)

Recommendations

The pieces of steel wedged between the backwall of the north abutment and the concrete deck should be removed.

The cracks in the backwall of the south abutment should be kept under observation.





Photograph 5 - Pieces of steel jammed between back-wall of north abutment and concrete deck.



Photograph 6 - Slope paving at the north abutment.

Pier and Channel Investigation (Below Water)

The underwater inspection of Piers 1N and 1S was made by Caldwell's Diving Company, Inc., of Toms River, New Jersey. The diver's firm furnished the necessary personnel and equipment to complete the underwater inspection work. The subsurface examination of the piers and the adjacent canal bottom was made using scuba diving equipment.

A thorough subsurface examination of the piers was made of the granite and concrete to the bottom of the canal. The piers were checked for stone and concrete damage and loss of mortar from the granite joints. The granite surface of the pier shafts was inspected by the diver moving up, down and across the pier face, following the joints in the granite block. Concrete surfaces below the granite facing and above the canal bottom were examined across each pier face

in areas sized by the extent of the diver's reach. The canal bottom surrounding the piers was examined for scour.

The joint between the concrete and the granite blocks of the pier shafts, shown at Elevation +12.0 on the contract drawings, was the reference elevation used to establish the M.L.W. during the diving and hydrographic survey work.

According to as-built drawings, Piers 1N and 1S are founded on H-piles driven inside a stay-in-place sheet pile cofferdam and capped with a 15-foot deep tremie concrete seal. This supports a 9-foot thick distribution block with a top elevation of -22.5. Twin pier shafts are supported on top of a 9-foot deep concrete base, constructed on the distribution block. The pier shafts are faced with granite between Elevation 0 and Elevation +12.

The detailed findings of the underwater inspection of the piers and the channel survey soundings follow.

a) Piers 1N and 1S

The concrete bases and distribution blocks were exposed above the mud line only on the channel side of Piers 1N and 1S. Concrete surfaces and granite facings were reported to be in excellent condition except for a one-foot square area of spalled concrete on the east face of the east pier shaft of Pier 1N. This area is located 5 feet to 6 feet below mean low water.

b) Channel Survey

Fathometer readings were taken to record the existing channel bottom. The readings were taken on seven range lines parallel to the bridge, including the bridge centerline, lines along the outside faces of the shafts and in lines approximately 50 and 100 feet east and west, respectively of each pier face. The fathometer readings were recorded on Drawing 1-2 and the elevations derived from these readings

are shown on Drawing 1-3, appended. They indicate a fairly uniform bottom between Elevations -36.5 and -43.5, extending through a channel width of 450 feet. Comparison of the latest profile lines with those shown in the 1975 report shows that the present canal bottom is deeper; the canal bottom was dredged in the summer of 1979.

#### SUPERSTRUCTURE STEELWORK

##### Fixed Bearings

All fixed bearings were in place and secure on the pier tops.

Many pin openings have accumulations of pack rust and paint. These materials in the pin openings should be removed, the openings thoroughly cleaned and painted.

Sole plates and masonry plates exhibit surface pitting and rusting. These areas should be cleaned and spot painted with a system compatible with the existing paint system.

##### Expansion Bearings - Abutments

The expansion bearings at the abutments are the sliding type consisting of sole plates, bearing on bronze base plates, with lubrite inserts.

The east and west bearings of the south abutment do not appear to be functioning as indicated by unbroken paint at the lubrite plate - sole plate interface. After rust and paint at these interfaces have been cleaned, the bearings should be monitored for movement. If they are not functioning, additional remedial work may be required.

The bearing assemblies at the north abutment appear to be functioning. There is some rusting at the lubrite plate-sole plate interface that should be cleaned.

Sole plates and masonry plates at both abutments exhibit surface pitting and rusting. These areas should be cleaned and spot painted with a system compatible with the existing paint system.

#### Expansion Bearings - Girder Spans

The expansion bearings are the rocker type. Rocker leans were measured and compared with past readings. These readings are tabulated on Drawings 1-4 and 1-5, appended. The position of all rockers were as expected or within tolerable ranges for the temperature at the time of the inspection. However, comparison of the rocker leans with past readings at Pier 1S indicate the possible movement of one or more piers. The number of and variation of readings does not allow a definite conclusion. Therefore, annual readings of the rocker leans on Piers 2N, 1S and 3S are recommended.

There are accumulations of pack rust, concrete, paint and debris between many rockers and their masonry plates and in many pin openings restricting movement of these devices. (See Photographs 7 and 8.) These materials should be removed, the pin openings thoroughly cleaned and painted.



Photograph 7 - Pier 9S - Debris under northeast rocker.



Photograph 8 - Pier 16S - Rust and dirt in rocker pin opening.

Most masonry plates exhibit surface pitting and rusting. The anchor bolts and their nuts connecting bearing units to the floorbeams are rusted. These plates should be cleaned and spot painted with a system compatible with the existing paint system.

#### Expansion Bearings - Arch Spans

The expansion rockers at Pier 1S appear to be functioning properly.

The roadway stringers in the arch span are supported at the floorbeams by plate bearings. Provisions for movement are made at one end of each stringer while the opposite end is fixed. Concrete and debris on and behind the bearing units at L2', L3', L4', L5', L6', L7', L7, L5, L3 and L2, are restricting movement and should be removed.

The sole plate of the second stringer west of the east tie girder on the south side of L2 is not bearing fully on its fill plate. To obtain proper bearing, a shim plate should be installed between these plates.

Base plates, fill plates and anchor bolt nuts exhibit surface pitting and rusting and should be cleaned and spot painted with a system compatible with the existing paint system.

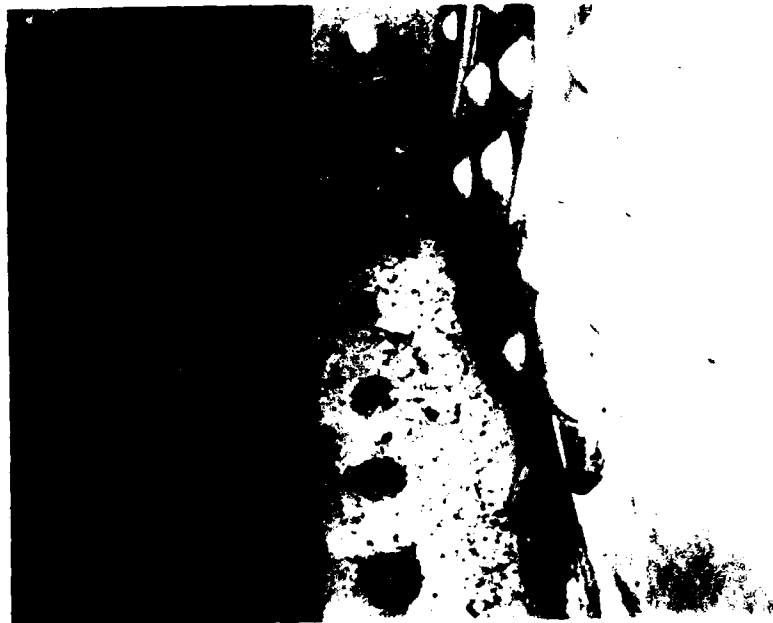
#### Structural Steel - Girder Spans

Alignment of individual members is good.

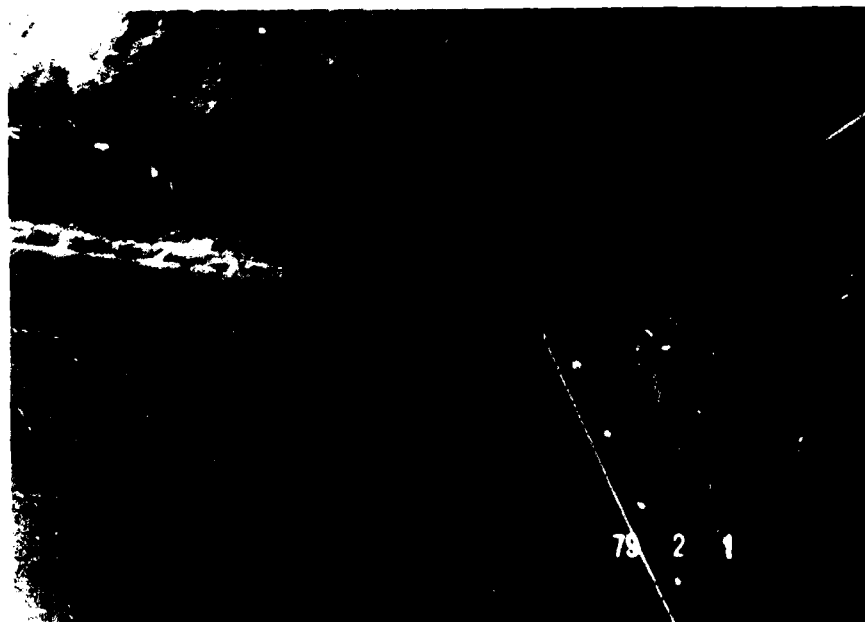
Under or adjacent to most expansion joints heavy rusting has occurred at the floorbeam upper and lower flanges, their cover plates, lower portions of the floorbeam web and web stiffeners, the upper and lower flanges of diaphragms, the web and the upper and lower flanges of stringers. The heaviest rusting has occurred at the end diaphragms which support the filled expansion joints. (See Photographs 9, 10 and 11.)



Photograph 9 - Typical deterioration of bottom flange angle of girder span floorbeam under expansion joint.



Photograph 10 - Typical deterioration of bottom flange angle of girder span floorbeam under expansion joint. Sand on bottom flange angle is visible.



Photograph 11 - Typical deterioration of upper flange of a diaphragm under an expansion joint over a fixed pier of a girder span.



The deterioration of the structural steel on the fixed piers may be the result of leakage through the original filled expansion joints, which have since been replaced. No leakage through the present expansion joints was observed during the inspection.

Deterioration of the structural steel at the expansion piers is due to leakage at drainage troughs located under all finger joints. Sand and moisture were noted on pier tops and on the bottom flanges of many end floorbeams during the inspection. (See Photograph 10.)

These rusted areas should be cleaned in accordance with the applicable SSPC Specifications and spot painted with a protective coating system compatible with the existing paint system. Although section loss did not appear to be structurally significant, the members should be measured and evaluated after cleaning to determine if reinforcing of these deteriorated members is required.

Many rivets are starting to deteriorate in the lower flange angles of the floorbeams, adjacent to the expansion joints. The rivets in the lower flange angles should be cleaned and painted promptly to prevent further section loss of the rivet heads that will eventually require their replacement.

A nut is missing from a bolt on the top flange of the west girder adjacent to the fourth floorbeam north of Pier 2N. This nut should be replaced and tightened in accordance with the AASHTO requirements.

Excessive section loss was noted on lower end of the southwest bearing stiffener at Pier 10N. The area of deterioration is 1 foot long and 3 inches wide. This area should be cleaned and a patch plate added.

Concrete was noted on the lower interior flange angle of the girders between Piers 3N and 6N and Piers 8S and 9S. This concrete

should be removed because it is potentially hazardous to vehicles and pedestrians passing below or adjacent to it.

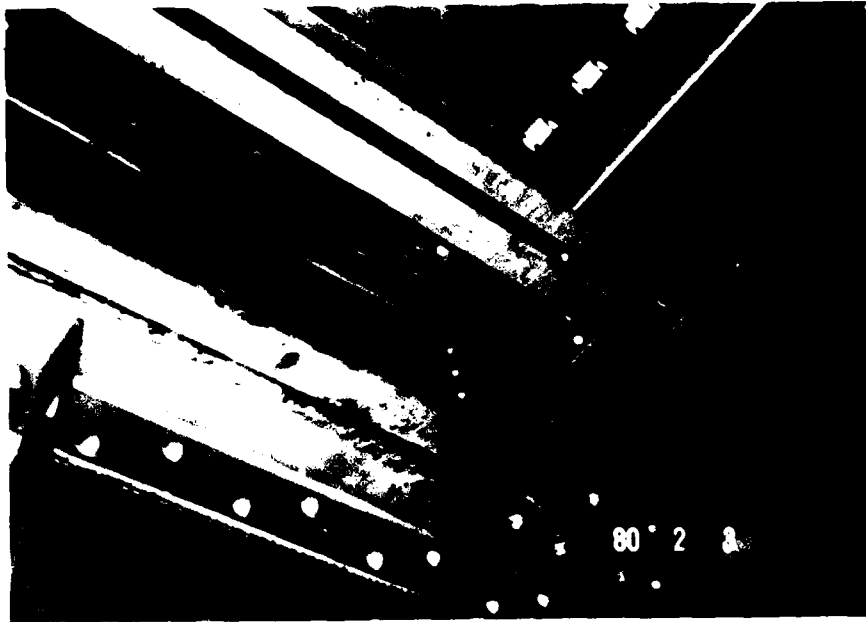
Structural Steel - Arch Span

a) Superstructure Below Roadway

The structural steel is in good condition. Moderate rusting has occurred on the upper and lower flanges of diaphragms, upper flanges of floorbeams, and the webs and the upper and lower flanges of stringers under or adjacent to all the filled expansion joints. (See Photographs 12 and 13.) Leakage was observed at floorbeam L7 between the fifth and sixth stringers west of the east tie girder. The deterioration of the structural steel at all other locations may be the result of leakage through the original joints, which have since been replaced.



Photograph 12 - Typical deterioration of lower flange of diaphragm, web and lower flange of stringer, and bearing plates under an expansion joint of tied-arch.



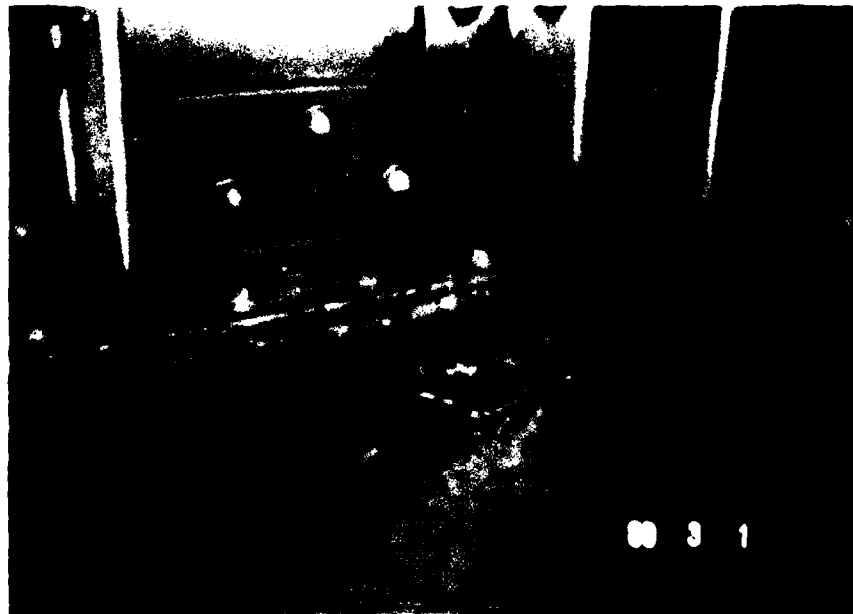
Photograph 13 - Typical deterioration under expansion joints of tied-arch span.

Sand and moisture were noted on most lateral gusset plates located at the ends of the floorbeams. (See Photograph 14.) Rivet heads are deteriorating on the lower flanges of floorbeams and the tie girders at the gusset plates.

These rusted areas should be cleaned in accordance with the applicable SSPC Specifications and spot painted with a protective coating system compatible with the existing paint system.

Rivets in the lower flanges of floorbeams and tie girders at the gusset connections should be cleaned and painted promptly to prevent further section loss that will eventually require their replacement. These gusset plates should be washed each spring to remove roadway salts and sand that splash on them from the openings between the roadway and the tie girders.

One section of the walkway grating located adjacent to the east tie girder between L0' and L1' is not properly fastened and its edge projects above the adjacent grating presenting a tripping hazard. One section of grating adjacent to the north floorbeam at L0' projects above the adjacent section and presents a tripping hazard. These sections of grating should be reset or replaced.



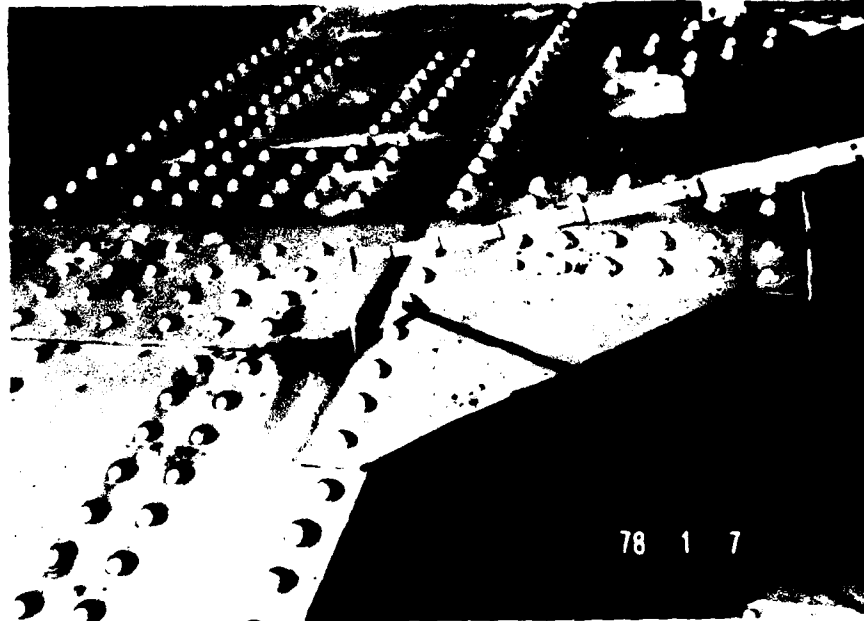
Photograph 14 - Typical accumulation of sand on lower lateral gusset plate of tied arch.  
Corrosion of floorbeam and tie-girder lower flange angles and webs is evident.

b) Superstructure Above Roadway

The arch superstructure is in good condition except for areas of paint blistering and related rusting (refer to CONDITION OF PAINT AND EXTENT OF DETERIORATION).

Rust has caused a 1/2 inch separation between the edges of upper splice plate and upper cover plate at Panel Points U2 and U3 of

the east and west arches. (See Photograph 15.) These gaps should be cleaned and sealed.



Photograph 15 - Separation of corner of upper splice plate and upper cover plate on the top chord of the west tied arch due to rust.

The ladder on the west side of the tied arch at L7'-U7' has sustained impact damage. The damage should be repaired and spot painted or the damaged section replaced.

c) Interior of Tie Girder

The interior of the tie girders is in very good condition.

One rivet is missing in the connection of the east web and vertical leg of the angle connecting it to the interior diaphragm of tie girder between L2' and L3' is missing.

The missing rivet should be replaced with high a strength bolt and tightened in accordance with the AASHTO requirements.

A few rivets were missing in the angles connecting the interior diaphragms and the tie girders at the following locations:

East tie girder - L1', between L3' and L4',  
south of L7, L6 and L5  
West tie girder - L4', L6, L4 and L3

At these locations, holes have been drilled only in the legs of the angles probably as a result of incorrect fabrication. No remedial action is required..

The interior of both tie girders are dry and free of debris. Two drain holes in the west tie girder and half of the drain holes in the east tie girder were without screens. Since the screens were originally installed to prevent the entry of birds, they should be replaced.

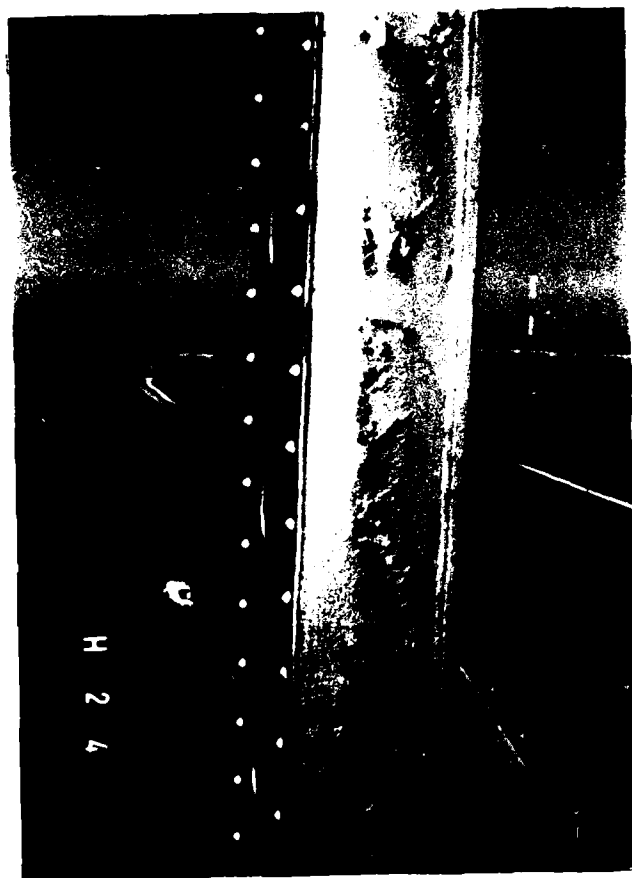
#### CONDITION OF PAINT AND EXTENT OF DETERIORATION

The condition of the paint on the girder spans is good, except on the structural steel under or adjacent to the expansion joints (refer to Structural Steel - Girder Spans). There are areas of minor rusting and pitting of paint on the top and bottom flanges of floorbeams and stringers, and the lower flange cover plates of girders and gusset plates.

The webs of the channels supporting the tooth dams are heavily rusted adjacent to the drainage troughs.

The condition of the paint on the structural steel of the arch span located below the roadway is good, except under or adjacent to the expansion joints (refer to Structural Steel - Arch Span - Superstructure Below Roadway). There is some pitting and blistering of paint of the flanges of stringers.

There are isolated areas of blistering of paint and minor section loss on the superstructure of the arch span located above the roadway, including the interior of the hangers and upper chord. The heaviest blistering is on the roadway side of the hangers. (See Photograph 16.)



Photograph 16 - Typical blistering of paint and corrosion on the roadway face of the tied arch hangers.

The exterior of the webs of the tie girders exhibit isolated areas of blistering of paint and minor rusting.

The paint in the interior of the tie girders is in good condition. There are some isolated areas of pitting and peeling of paint in the interior of the west tie girder.

The condition of the paint on the bearings is discussed in SUPERSTRUCTURE STEELWORK - Fixed Bearings and Expansion Bearings.

The bridge railing exhibits areas of paint pitting and minor rusting.

To prevent deterioration caused by rust, all rusted surfaces and all areas of pitted or peeled paint should be cleaned in accordance with the applicable SSPC Specifications and spot painted with a protective coating compatible with the existing paint system.

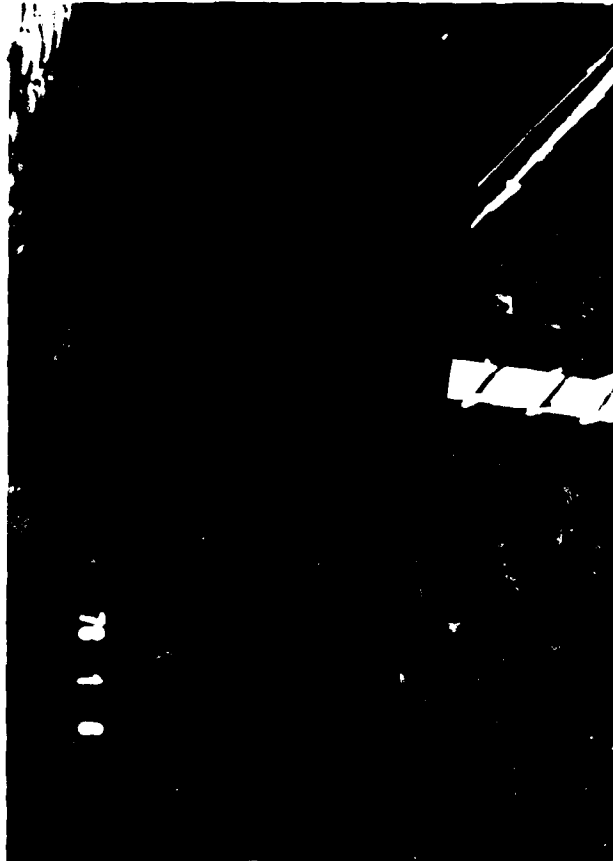
The webs of the channels supporting the tooth dams should be coated with coal tar epoxy after their cleaning.

The following locations entrap moisture and promote rusting:

1. Back to back of angles comprising lateral members of the tied arch.
2. Gaps between web plates and the legs of angles of the lower and upper chords of the tied arch.
3. Gaps between edges of cover plates at the base of hangers of the tied arch.
4. Gaps between plates and angles of floorbeams and girder at gusset plate connections on the underside of the tied arch.
5. Gaps between top plate of upper chord and the east and west gusset plates at the ends of both tied arches (See Photograph 17.)
6. Gaps between web plates and legs of angles of lateral members of the upper chord of the tied arch.

These gaps should be cleaned and sealed in order to avoid extensive future repairs.



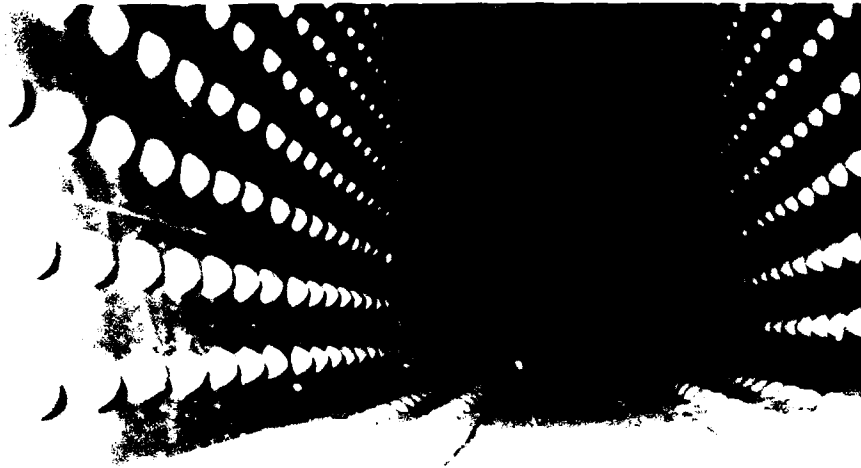


Photograph 17 - Rust in gap between upper plate and gusset plates at the north end of the upper chord of the east tied arch.

Pigeon roosts were noted in the upper chords of the arch span. (See Photograph 18.) There is a heavy accumulation of bird excrement in these members. We suggest screening the openings in the upper chords to prevent access to birds, as was done to the openings in the tie girders, after the bird excrement has been removed and any subsequent paint damage repaired.

There is a heavy accumulation of bird excrement on the lateral members on the underside of the tied arch between L0' and L3' and L1 and L2, and on the lower gusset plate connections of the upper chord

and laterals of the tied arch. This excrement should be cleaned from the steel surfaces and all subsequent paint damage repaired.



Photograph 18 - Pigeon roost in upper chord of tied arch.

#### BRIDGE DECK

##### a) Below Deck

The stay-in-place forms used for the deck are in very good condition.

The exposed concrete where stay-in-place forms were not employed is in very good condition.

##### b) Above Deck

The deck is in very good condition, exhibiting scattered minor transverse cracking.

The concrete deck adjacent to the edges of the steel angles of most expansion joints exhibit minor spalling. This deterioration

should be kept under observation and the spalled areas repaired with epoxy mortar if they continue to deteriorate.

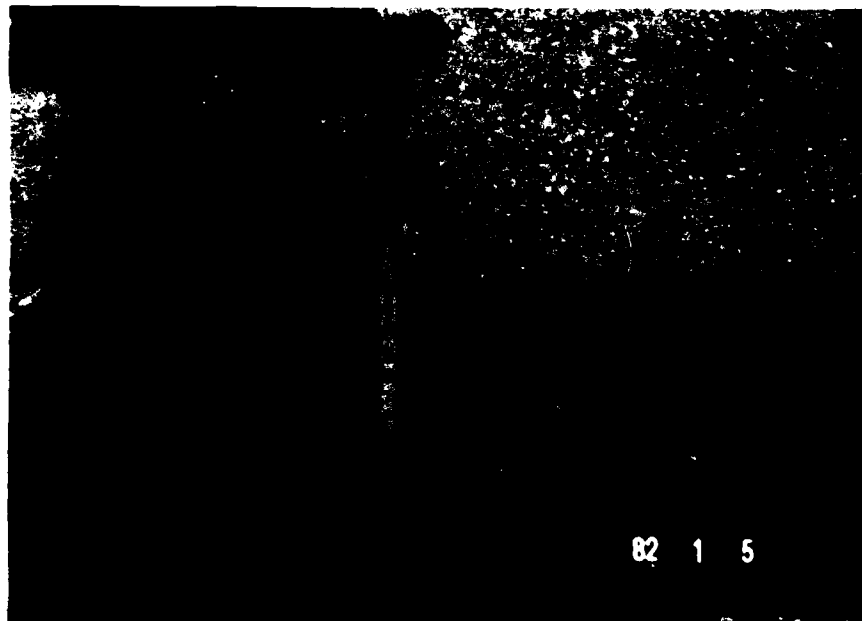
Sand was present adjacent to most of the bridge curb lines. These accumulations should be cleaned on a regular basis to prevent blockage of roadway drainage units and damage to the bridge expansion joints.

c) Approach Pavements

The approach pavements are in good condition.

d) Roadway Joints

The neoprene compression joint seal at many expansion joints has either settled or had been set improperly as evidenced by their position. The top surface at individual joints varies along its length and in some locations is 1/2" below the finished roadway grade. (See Photograph 19.)



Photograph 19 - Sand on expansion joint; finished grade of neoprene seal varies along its length.

There is minor separation of the neoprene compression joint seal and joint angles at several locations. This will eventually permit the passage of water through the roadway joint. Joint leakage was noted only at L7 of the tied arch; during the time on the inspection it did not rain. Corps of Engineers' personnel had stated that the deterioration of the structural steel under or adjacent to the expansion joints was due to leakage of the original joints prior to their replacement in 1978.

Most expansion joints are full of sand and grit accumulations. These accumulations should be removed on a regular basis to prevent damage to the neoprene seal and separation of the neoprene seal from the angles which will permit leakage.

#### RAILINGS, FENCES, CURBS AND SIDEWALKS

Bridge railing and approach guide railing are in good condition. One section of the east bridge rail has impact damage. This damage should be repaired and spot painted.

Several bridge post caps are missing on the west rail between Piers 2N and 3N should be replaced.

Fencing located on the outside of the bridge rail is in good condition. The fence located between L0' and L1' of the east arch should be properly anchored to its post.

Curbs and sidewalks are in good condition.

Two bolts attaching the west guide rail to the concrete parapet located 3 feet south of the south abutment are loose. These bolts should be reset in non-shrink grout.

DRAINAGE

The steel straps securing the copper drainage baffles to the channel diaphragms are heavily deteriorated at all tooth expansion joints. (See Photograph 20.) These baffles, which were designed to direct the roadway rainfall runoff that passes through the tooth dams into the troughs, are sagging and displaced due to the lack of support. The lower edges of many baffles are now located outside the drainage troughs. The result of these baffle displacements is that water and debris fall on the structural steel and pier tops below. (See Photograph 21.) During this inspection water and sand was noted at these locations.



Photograph 20 - Typical deterioration of straps attaching copper baffles to diaphragm at drainage troughs.

All the straps securing the drainage baffles should be replaced with galvanized straps and hardware and the baffles reset.

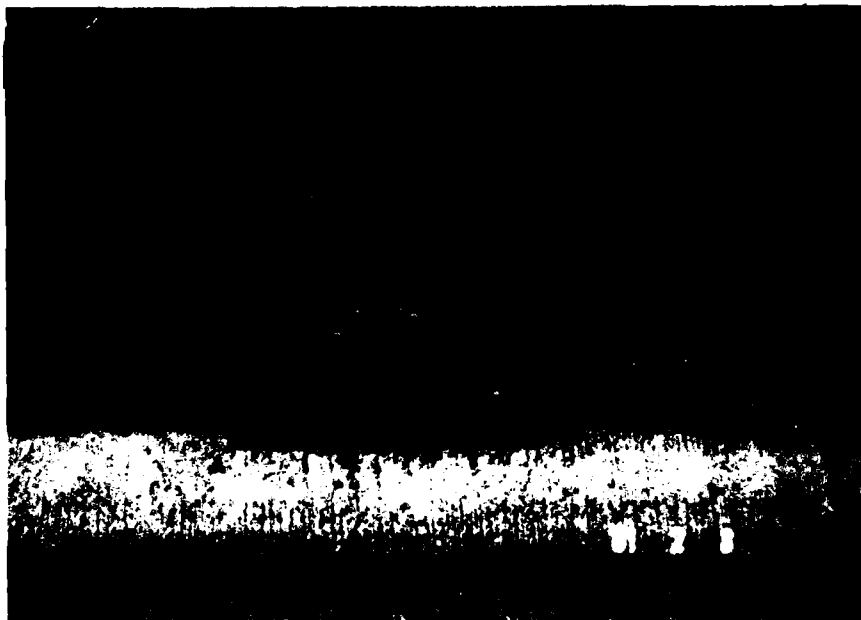


Photograph 21 - Gap between drainage trough and copper baffle that allows water to fall on structural steel and pier top below trough. Tooth dam can be seen through this gap.

Several roadway drainage inlets are clogged with sand and debris. (See Photograph 22.) Many of the drainage troughs are partially clogged with sand and debris. Sand was noted along both curb lines of the roadway. Periodic cleaning of the roadway and flushing of the drainage inlets and troughs is required.

The elastomeric caulking around many inlets is missing and should be replaced.

The drainage ditch located east of the bridge between Piers 14S and 15S is choked with weeds. Water is ponding in the ditch south of Pier 14S due to this blockage. The weeds should be removed to render this drainage ditch operable.



Photograph 22 - Drainage inlet along east curb line  
clogged with debris.

Erosion is evident beneath the drainage pipes on Piers 16S and 17S. Stone placement was noted at these locations, but has settled. Additional fill is required at these locations.

Sections of the paved drainage gutter adjacent to the north abutment's slope paving have settled and should be reset to their proper grade.

Debris in the lower end of the paved drainage gutter located on the west side of the north abutment's slope paving should be removed.

Portions of the brick collar under the casting of the manhole located 20 feet southeast of Pier 2S is broken and should be replaced.

GENERAL SITE AREA

Excessive weed overgrowth is present under the bridge between Piers 7N and the north abutment, and Piers 1S and 2S. Removal would improve the appearance of the bridge's right-of-way and prevent dumping of debris. The heavy weed growth adjacent to the exit from the stairway at Pier 10N could be a tripping hazard and should be removed.

There are encroachments on the bridge right-of-way between Piers 3S and 4S and between Piers 8S and 9S. These include fencing, firewood and wooden pallets. Residents near the bridge right-of-way should be cautioned about storage or other use of the property.

A firehose being used to pump water across the bridge has its discharge end hanging from the bridge adjacent to Pier 2S. The ground beneath the discharge end of this hose is heavily eroded. This area should be filled with stone or gravel to prevent future erosion.

The land under the bridge between Piers 8S and 10S and 3N and 4N has holes that will fill with water when it rains. Regrading would eliminate this condition.

A town hydrant located between Piers 12S and 13S is leaking and causing ponding of water between Piers 13S and 14S and erosion adjacent east face of Pier 15S. This leak should be repaired, and the flooded area regraded and eroded area filled.

Several lenses, bulbs and protective shields of the hand-rail lighting system located adjacent to the east sidewalk are broken or missing and should be replaced.

Pier numbers which have been written on the south piers are incorrect and should be revised. Adding numbers on the north piers, and on the railing above the piers to facilitate identification is suggested.



#### 1.04 SUMMARY

The Chesapeake City Bridge is in good structural condition.

The most important items of maintenance and repair relate to cleaning and painting metalwork under the joints in the girder spans. Periodic cleaning of the roadway gutters, neoprene expansion joints, and flushing of the roadway drainage system and tied-arch lower gusset plates would be a cost-effective preventative maintenance program.

#### 1.05 Recommendations

The 1979 inspection of the Chesapeake City Bridge revealed deficiencies, described in the report. These deficiencies and recommendations for repairing these items and for maintenance are summarized as follows:

#### SUBSTRUCTURE

##### Main Pier

1. Pier 1S: Patch surface spalls with epoxy and mortar. Keep the cracks in the pier shafts under observation. Erect a safety railing around the platform at the base of the ladder leading from the superstructure to the top of Pier 1S.
2. Pier 1N: Keep the cracks in the pier shafts under observation.

##### Approach Piers

3. Repair spalled concrete with epoxy and mortar.
4. Keep cracks in the pier shafts under observation.
5. Remove loose grout plugs in form tie-holes on Piers 12S and 14S.
6. Fill unplugged form tie-holes with epoxy and mortar when other work is being performed at a pier location.

Access Stairways

7. Repair spalled concrete with epoxy and mortar.
8. Repair or replace broken handrails on Pier 10N.
9. Replace cracked and settled sidewalk at base of Pier 10N.
10. Remove sand from Pier 10N stairway. Periodic cleaning of both stairways is recommended.
11. Seal gaps between riser and treads of steel portion of the stairway at Pier 10S.

Abutments

12. South Abutment: Keep backwall cracks under observation.
13. North Abutment: Remove metal wedged between backwall and concrete deck. Keep backwall cracks under observation.

SUPERSTRUCTURE STEELWORK

Bearings

14. Remove debris in pin openings and repaint. Remove debris from under rockers.
15. South Abutment: Monitor bearing units, after rust and paint at lubrite plate - sole plate interface has been removed, to ascertain if they are functioning.
16. Remove concrete on and behind bearing units of floorbeams L2', L3', L4', L5', L6', L7', L7, L5, L3, and L2 of arch span.
17. Install shim plate between sole plate and its fill plate at the 2nd stringer west of the east tie girder at the south side of L2.
18. Take annual readings of rocker leans on Piers 2N, 1S and 3S.

Structural Steel

19. Clean and paint rusted steel under or adjacent to the expansion joints of girder spans. Section loss should be measured and evaluated after cleaning to determine if reinforcing of these deteriorated members is required.
20. Replace missing nut of threaded fastener on the top flange of the west girder adjacent to the fourth floorbeam north of Pier 2N.
21. Install patch plate on the southwest bearing stiffener at Pier 10N.
22. Remove concrete on lower interior flange angle of girders between Piers 3N and 6N and Piers 8S and 9S.
23. Wash roadway salts and sand from lower gusset plates of the arch superstructure below the roadway each spring.
24. Reset or replace damaged walkway grating located on underside of tied arch between L0' and L1'.
25. Clean and seal gaps between upper splice plate and upper cover plate at Panel Points U2 and U3 of both arches.
26. Repair and spot paint, or replace damaged ladder at L7'-U7' of the west side of tied arch.
27. Install a high strength bolt in east web of east tie girder between L2' and L3'.

PAINT

28. Clean and spot paint rusted surfaces and areas of peeled and blistered paint.
29. Clean and paint webs of channels supporting tooth dams with coal-tar epoxy.
30. Seal gaps between structural members that entrap and promote rusting.
31. Remove bird excrement from interior of upper chords of tied arch and screen all openings.
32. Clean all steel surfaces of bird excrement.

BRIDGE DECK

33. Keep spalling adjacent to expansion joints under observation and repair with epoxy mortar if spalling continues.
34. Clean roadway deck and joints of sand and debris on a regular basis.

RAILING, FENCES, CURBS AND SIDEWALKS

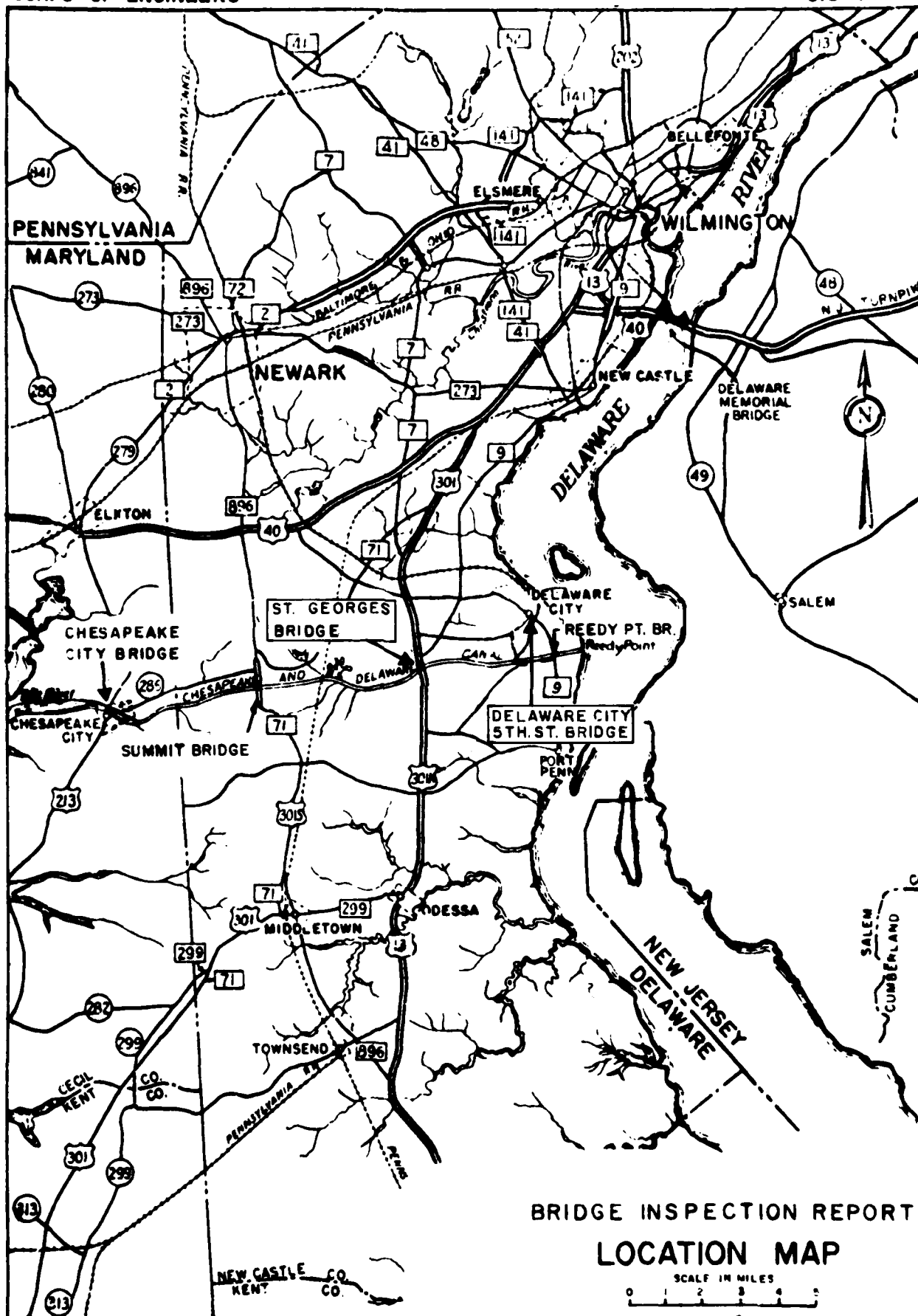
35. Repair and spot paint collision damaged east railing between Piers 5N and 6N.
36. Replace missing bridge post caps.
37. Secure fence to post on east side of tied arch between L0' and L1'.
38. Reset loose bolts connecting west guiderail to parapet adjacent to the south abutment in non-shrink grout.

DRAINAGE

39. Replace deteriorated straps securing the drainage baffles at expansion piers with galvanized straps and hardware.
40. Flush roadway inlets and drainage troughs.
41. Replace missing elastomeric caulking about inlet gratings.
42. Remove weeds in the drainage ditch located east of bridge between Piers 14S and 15S.
43. Place stone under drainage pipes at Piers 16S and 17S.
44. Reset sections of the paved drainage gutter adjacent to the east side of the north abutment slope paving.
45. Remove debris from paved drainage ditch adjacent to the west side of the north abutment's slope paving.
46. Replace damaged portions of brick collar under casting of manhole located 20 feet southeast of Pier 2S.

GENERAL SITE

47. Remove weeds located between Pier 7N and the north abutment, Piers 1S and 2S, and adjacent exit from stairway at Pier 10N.
48. Caution residents of encroachments on bridge right-of-way.
49. Place stone or gravel fill adjacent to the firehose at Pier 2S.
50. Regrade land between Piers 8S and 10S, and 3N and 4N.
51. Fill eroded areas and regrade between Piers 13S and 14S.
52. Replace missing and damaged lenses, bulbs and protective shields of handrail lighting.

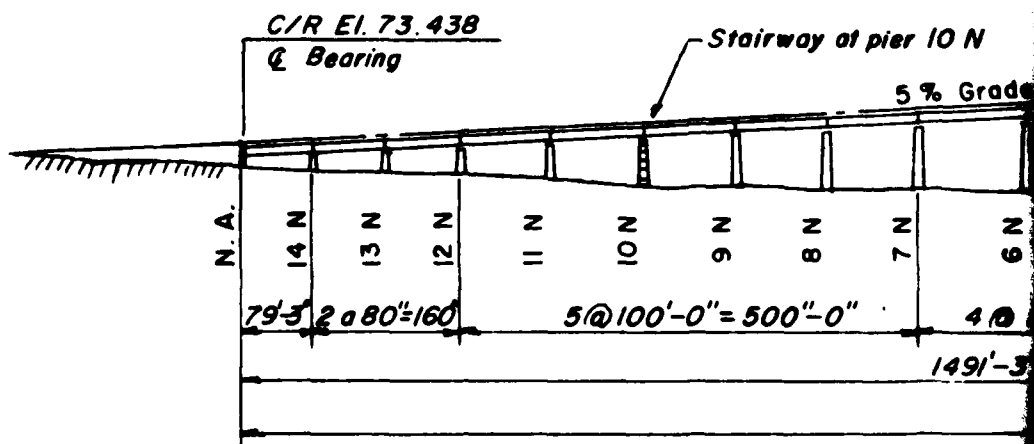
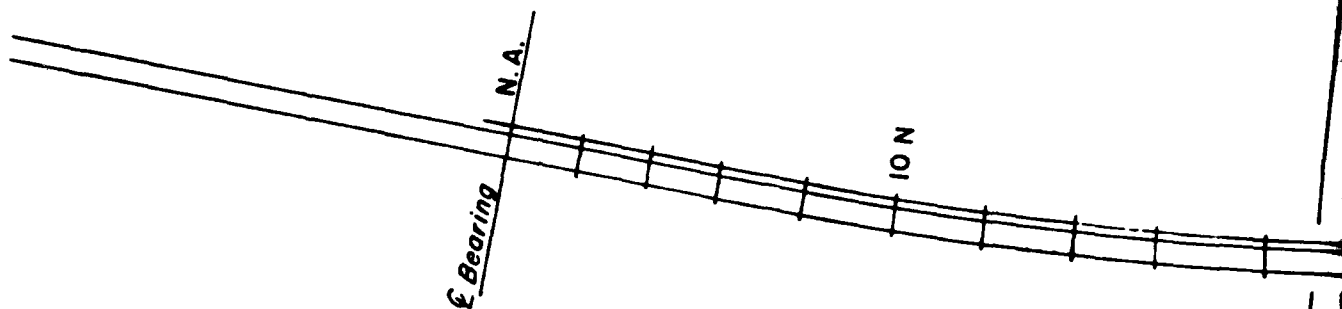


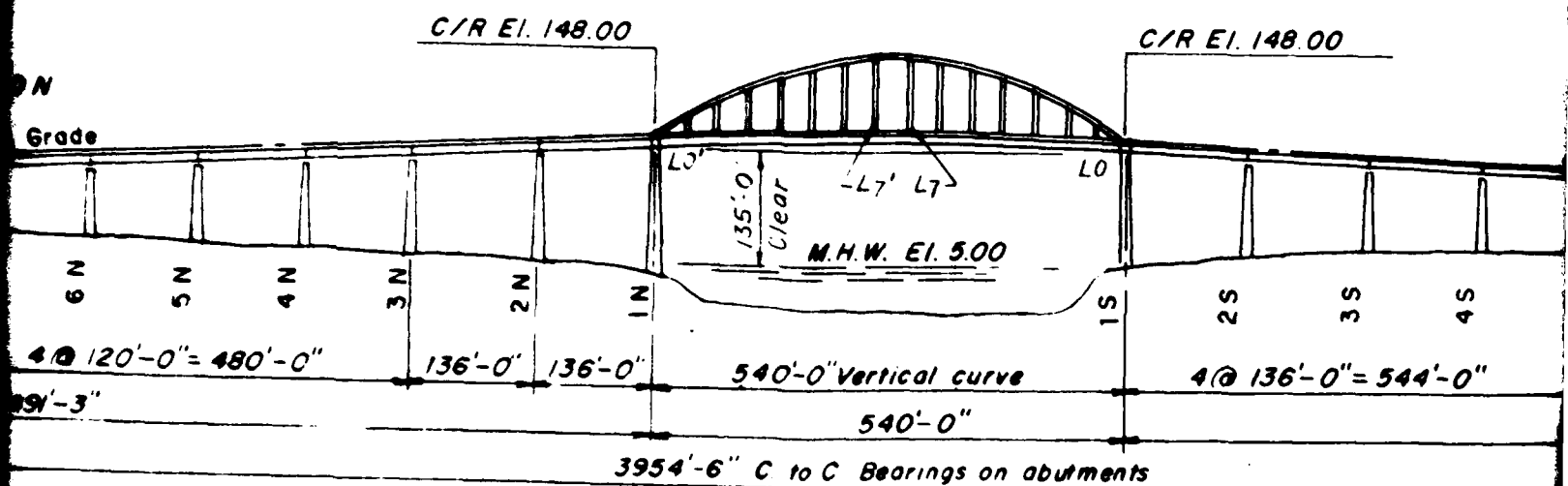
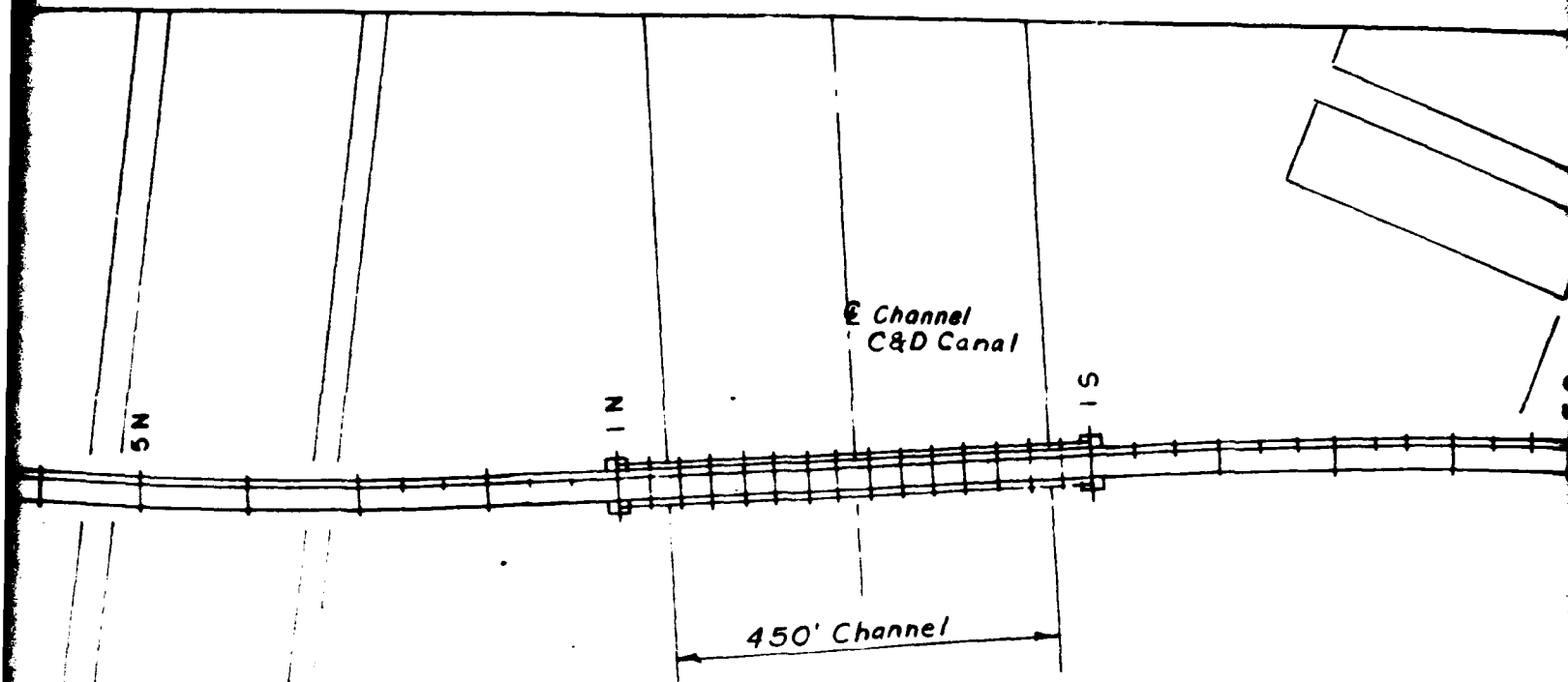
BRIDGE INSPECTION REPORT  
LOCATION MAP

SCALE IN MILES  
0 1 2 3 4 5

DRAWING 1-0

CORPS OF ENGINEERS







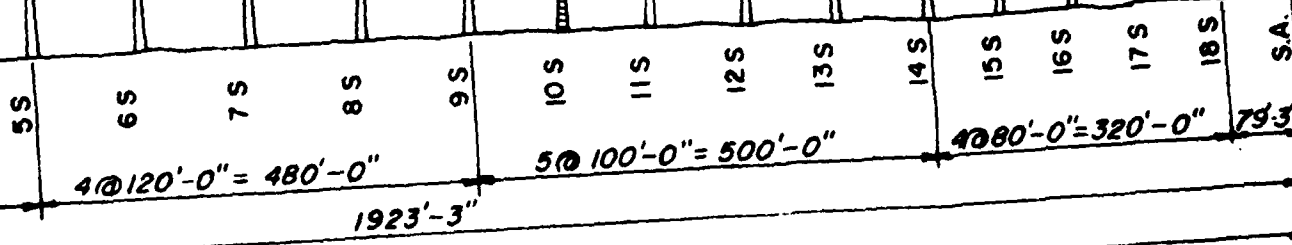
CHESAPEAKE CITY, MD.

SA  
E Bearing

C/R El. 51.838  
E Bearing

5% Grade

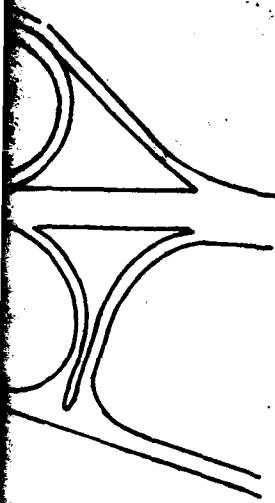
Stairway at pier 10S



C & D CANAL  
BRIDGE INSPECTION  
CHESAPEAKE CITY  
PLAN & ELEVATION

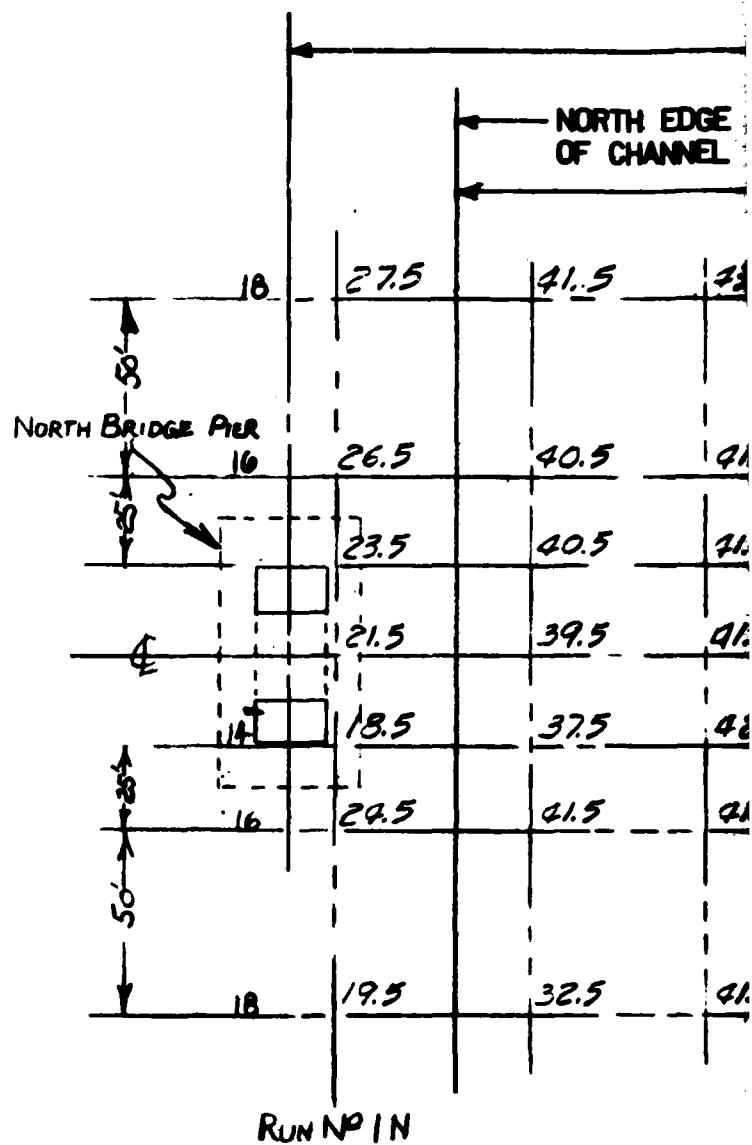
DRAWING 1-1

U.S. ARMY



AL  
N REPORT  
BRIDGE  
TION #IIB

# CORPS OF ENGINEERS



540' C.C. PIERS

EDGE  
CHANNEL

SOUTH EDGE  
OF CHANNEL

450' CHANNEL

33.5	41.5	41.5	40.5	42.5	41.5	42.5	45.5	20.5
41.5	41.5	41.5	41.5	42.5	41.5	42.5	37.5	15.5
41.5	41.5	41.5	41.5	43.5	43.5	41.5	41.5	18.5
41.5	42.5	41.5	42.5	42.5	41.5	42.5	36.5	20.5
42.5	41.5	41.5	42.5	43.5	42.5	41.5	42.5	16.5
41.5	41.5	40.5	43.5	42.5	42.5	43.5	41.5	21.5
41.5	40.5	40.5	41.5	41.5	41.5	44.5	47.5	21.5

C OF CHANNEL

RUN NO 15

TYPICAL DEPTH  
OF SOUNDING (FT.)  
MEASURED FROM  
M. L. W. EL. 0.0

SCALE: 1" = 50'

U.S. ARMY



20.5

RUN N° 4E

15.5

SOUTH BRIDGE PIER

RUN N° 3E

RUN N° 2E

RUN N° 1

RUN N° 2W

21.5

RUN N° 3W

21.5

RUN N° 4W

N° 15

FT.)

BRIDGE INSPECTION REPORT # 118

CHESAPEAKE CITY  
BRIDGE

FATHOMETER SURVEY

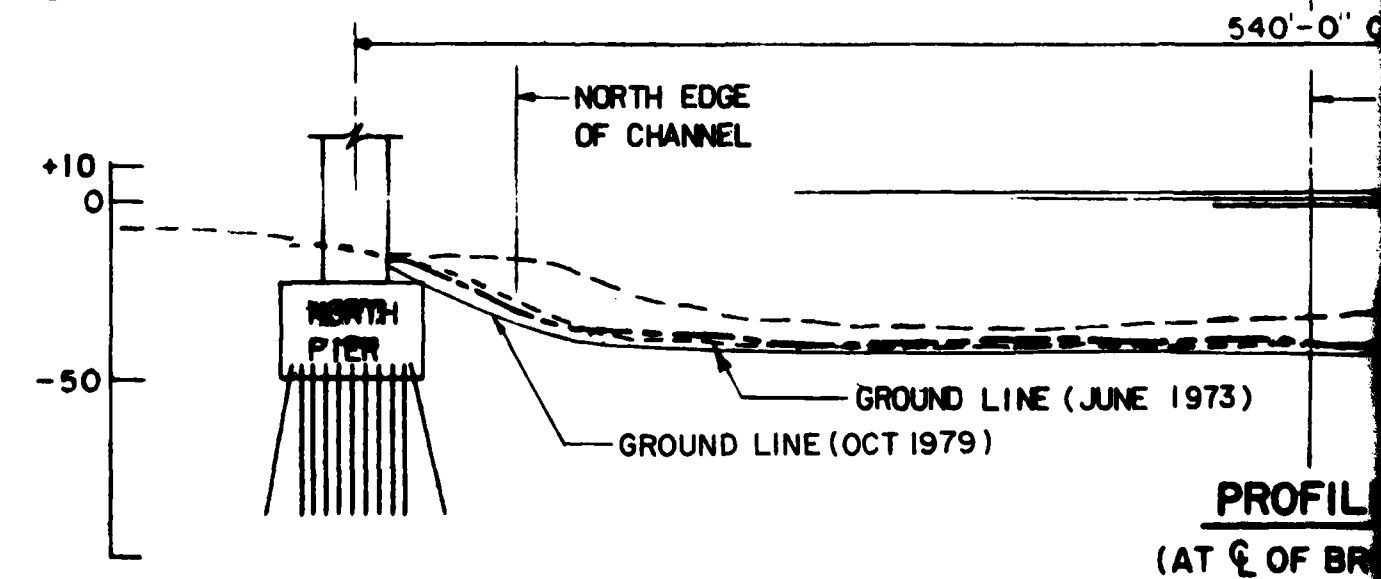
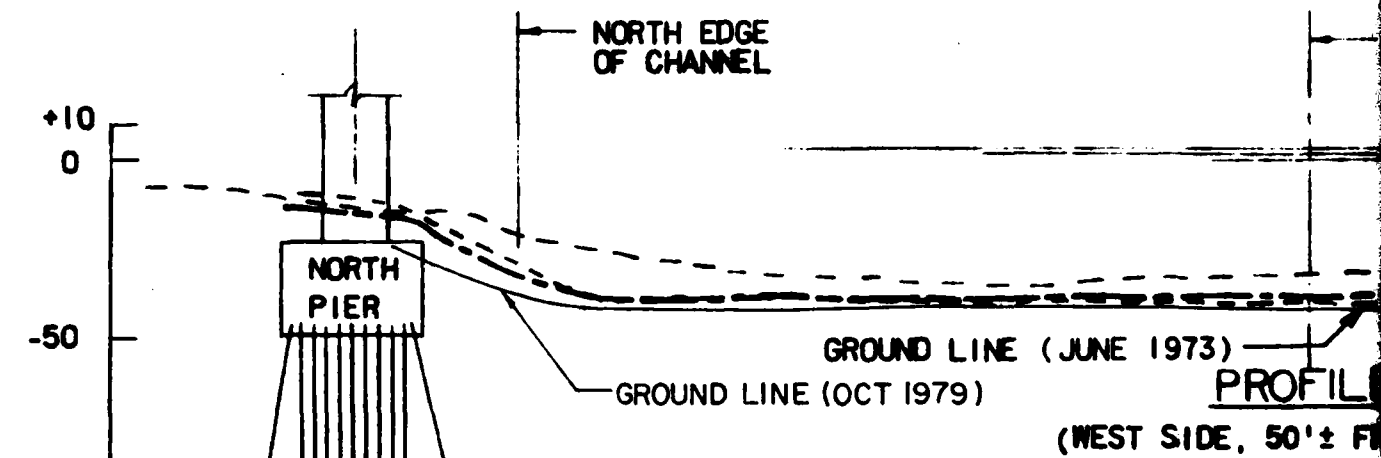
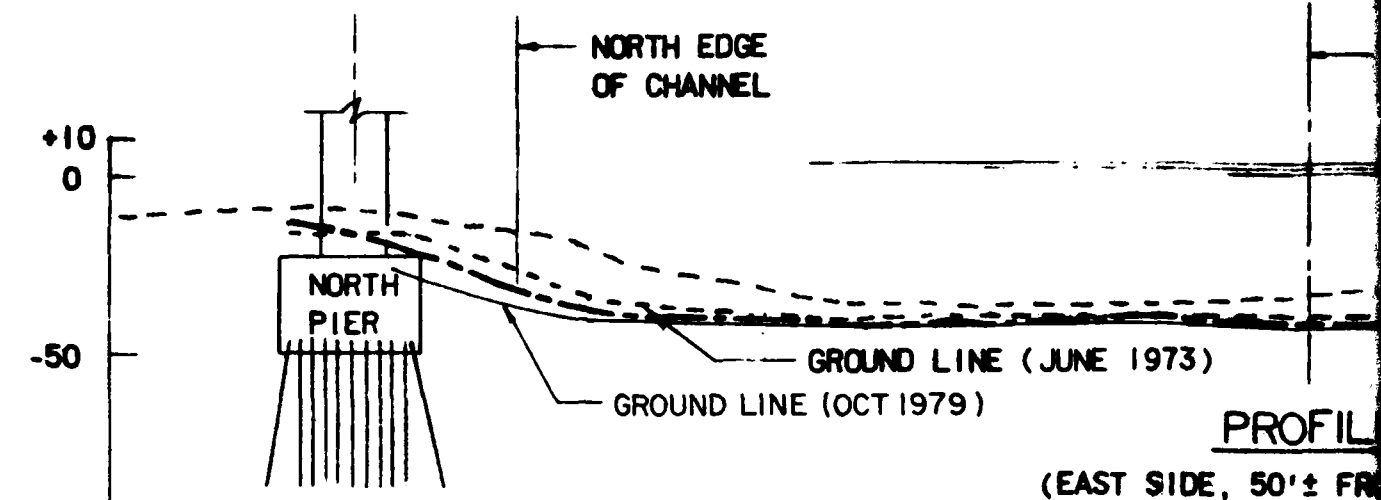
OCT. 11, 1979

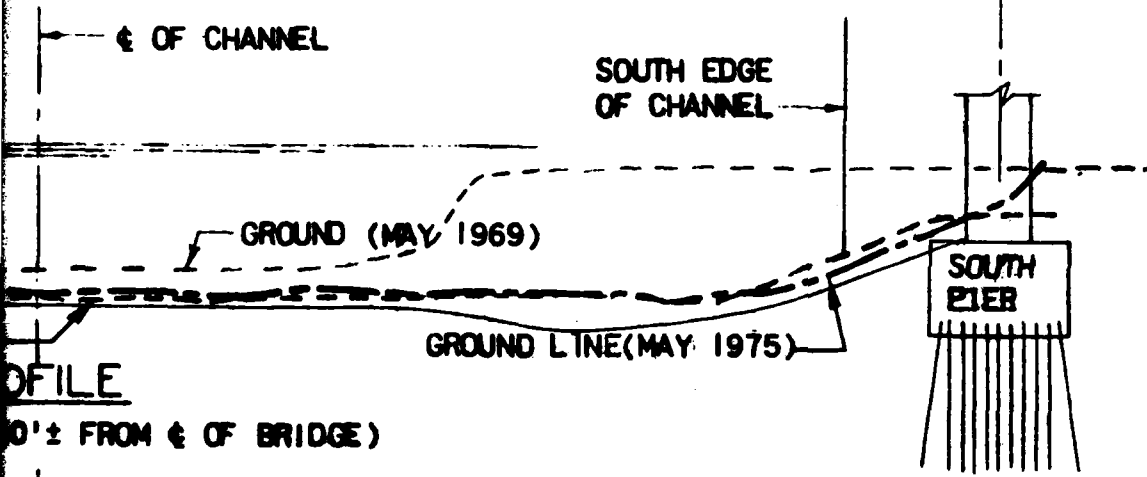
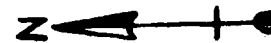
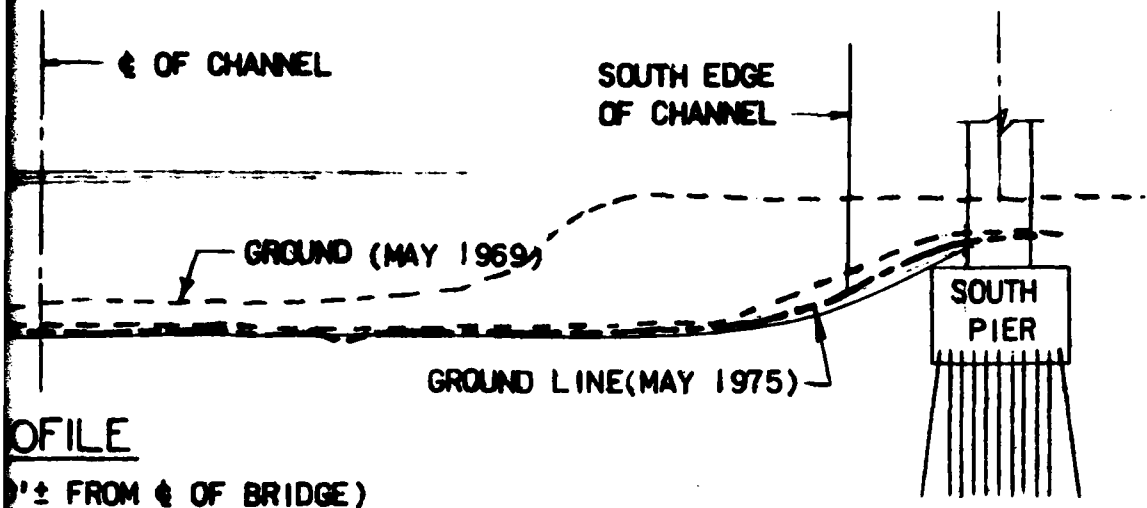
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TOMS RIVER NEW JERSEY 08768

CORPS OF ENGINEERS

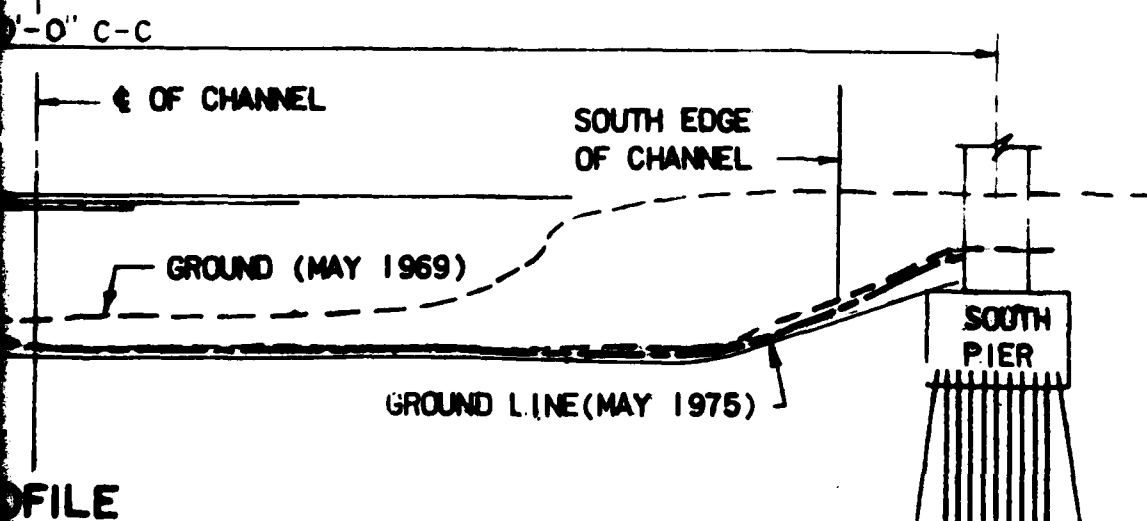




# NOTES:

ELEVATIONS REFER TO  
SURVEY DATUM (AS BUILT  
MAY 1969 GROUND LINE  
FROM CORPS OF ENGINEER  
SURVEY DATA.

JUNE 1973 & MAY 1975  
PLOTS FROM FATHOMETER  
BY OCEAN COUNTY DIVISION  
OCT 1979 GROUND LINE  
FROM FATHOMETER SURVEY  
DIVING CO., INC.



PROFILE  
OF BRIDGE)

BRIDGE  
CHESA  
HYDRO

U.S. ARMY



REFER TO C & D CANAL  
(S BUILT PLANS).  
GROUND LINES PLOTTED  
ENGINEERS HYDROGRAPHIC

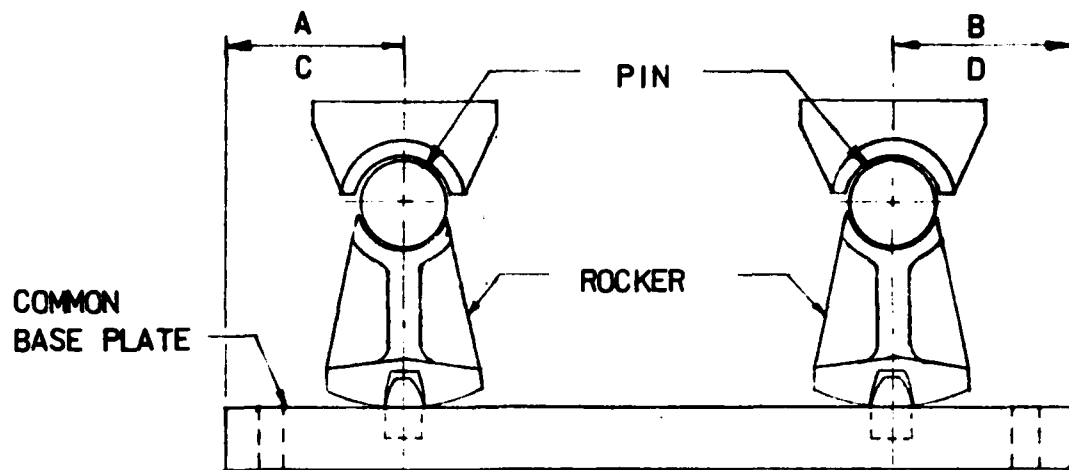
MAY 1975 GROUND LINES  
ATHOMETER SURVEYS  
BY DIVING, LTD.  
GROUND LINES PLOTTED  
BY SURVEYS BY CALDWELL'S

SCALE IN FEET

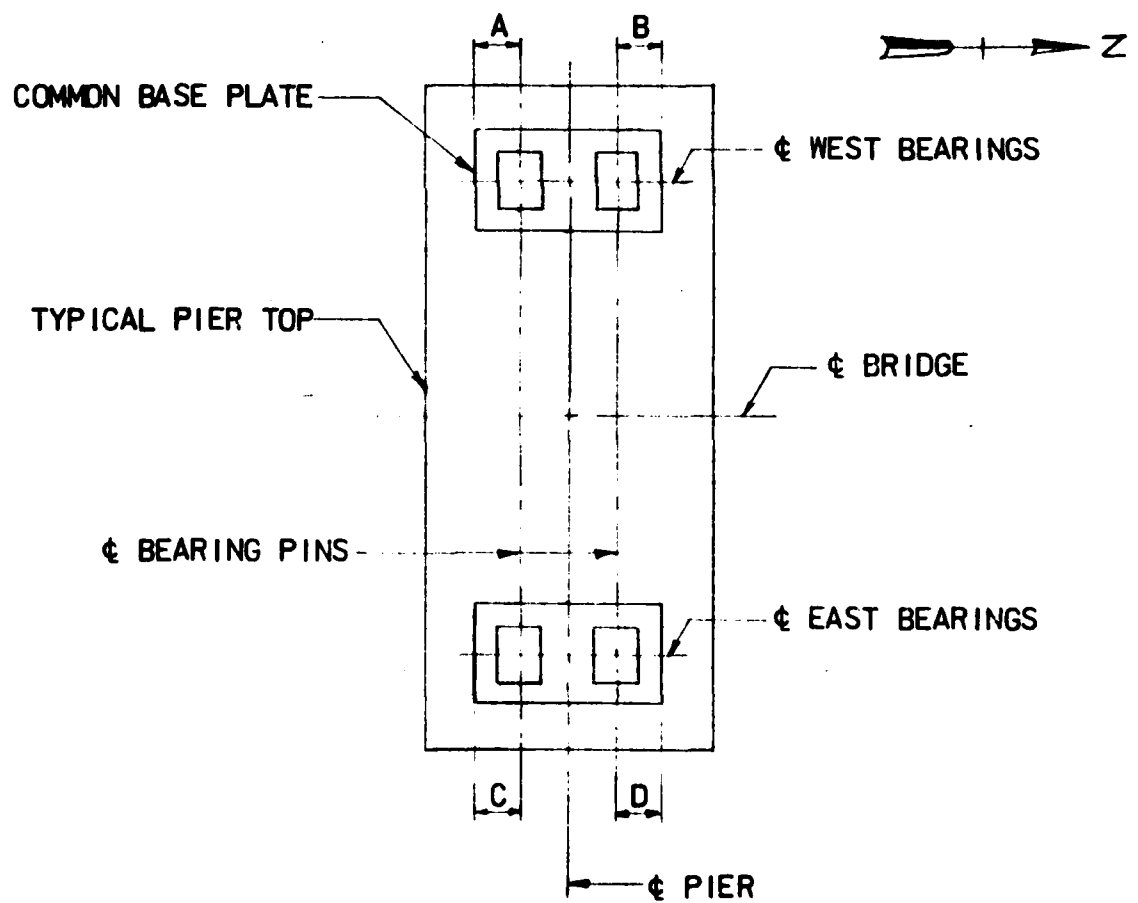


C & D CANAL  
BRIDGE INSPECTION REPORT  
CHESAPEAKE CITY BRIDGE  
HYDROGRAPHIC SURVEY





GIRDER EXPANSION BEARINGS



TYPICAL PLAN OF PIER BEARINGS

CHESAPEAKE C

## EXPANSION ROCKER BEARING

PIER	DATE	TEMP.	OFFSET DISTANCES (INCHES)				PIER	DATE	TEMP.
			A	B	C	D			
S. ABUT*	MAY 1973	78°	1*	-	13 <sub>16</sub> *	-	S. ABUT*	MAY 1975	73°
17S		56°	11 <sup>3</sup> <sub>8</sub>	11 <sup>1</sup> <sub>8</sub>	11 <sup>1</sup> <sub>2</sub>	10 <sup>5</sup> <sub>8</sub>	17S		67°
15S		56°	11	11 <sup>5</sup> <sub>8</sub>	11 <sup>1</sup> <sub>8</sub>	11 <sup>7</sup> <sub>8</sub>	15S		71°
13S		70°	11 <sup>1</sup> <sub>4</sub>	11 <sup>1</sup> <sub>2</sub>	10 <sup>7</sup> <sub>8</sub>	11 <sup>1</sup> <sub>2</sub>	13S		72°
11S		70°	11	11	10 <sup>3</sup> <sub>4</sub>	10 <sup>5</sup> <sub>8</sub>	11S		70°
9S		78°	11 <sup>7</sup> <sub>8</sub>	13 <sup>1</sup> <sub>2</sub>	11 <sup>1</sup> <sub>2</sub>	13	9S		74°
7S		76°	11 <sup>1</sup> <sub>4</sub>	12 <sup>1</sup> <sub>8</sub>	11 <sup>1</sup> <sub>4</sub>	12 <sup>1</sup> <sub>4</sub>	7S		69°
5S		74°	13 <sup>3</sup> <sub>8</sub>	11 <sup>3</sup> <sub>8</sub>	13 <sup>1</sup> <sub>4</sub>	11 <sup>1</sup> <sub>4</sub>	5S		71°
3S		74°	12 <sup>1</sup> <sub>2</sub>	11 <sup>7</sup> <sub>8</sub>	13	11 <sup>1</sup> <sub>2</sub>	3S		74°
2N		52°	12 <sup>3</sup> <sub>4</sub>	11 <sup>3</sup> <sub>8</sub>	12 <sup>3</sup> <sub>4</sub>	11 <sup>3</sup> <sub>4</sub>	2N		68°
4N		52°	12 <sup>1</sup> <sub>8</sub>	11 <sup>7</sup> <sub>8</sub>	11 <sup>7</sup> <sub>8</sub>	11 <sup>3</sup> <sub>4</sub>	4N		71°
6N		52°	11 <sup>7</sup> <sub>8</sub>	12 <sup>1</sup> <sub>2</sub>	11 <sup>7</sup> <sub>8</sub>	12 <sup>1</sup> <sub>2</sub>	6N		74°
7N		52°	-	12 <sup>5</sup> <sub>8</sub>	-	13	7N		75°
9N		53°	11 <sup>3</sup> <sub>8</sub>	11 <sup>3</sup> <sub>8</sub>	11 <sup>1</sup> <sub>4</sub>	11 <sup>3</sup> <sub>8</sub>	9N		74°
11N		53°	11 <sup>3</sup> <sub>8</sub>	11 <sup>3</sup> <sub>8</sub>	11 <sup>1</sup> <sub>8</sub>	11 <sup>1</sup> <sub>4</sub>	11N		77°
13N		53°	11 <sup>1</sup> <sub>4</sub>	11 <sup>3</sup> <sub>8</sub>	11 <sup>3</sup> <sub>8</sub>	11 <sup>3</sup> <sub>16</sub>	13N		77°
N. ABUT.*	MAY 1973	78°	-	11 <sup>3</sup> <sub>16</sub> *	-	1 <sup>1</sup> <sub>8</sub> *	N. ABUT.*	MAY 1975	80°

BRIDGE  
RAILING

READING (TOP RAIL)\*  
A & C SO. ABUT.  
B & D NC. ABUT.

CONCRETE

NOTE: ALL MEASUREMENTS TAKEN ALONG  
SIDE OF BEARINGS OR RAILINGS  
TOWARD & BRIDGE.

ABUTMENTS

2

## CITY BRIDGE

## ALIGNMENT MEASUREMENTS

OFFSET DISTANCES				PIER	DATE	TEMP.	OFFSET DISTANCES			
A	B	C	D				A	B	C	D
13 <sup>*</sup> <sub>16</sub>	-	13 <sup>*</sup> <sub>16</sub>	-	S.ABUT. <sup>*</sup>	OCT 79	50°	15 <sub>16</sub>		15 <sub>16</sub>	
11 <sup>5</sup> <sub>16</sub>	10 <sup>9</sup> <sub>16</sub>	11 <sup>1</sup> <sub>2</sub>	10 <sup>3</sup> <sub>8</sub>	17S		77°	11 <sup>1</sup> <sub>2</sub>	10 <sup>3</sup> <sub>4</sub>	11 <sup>5</sup> <sub>8</sub>	10 <sup>3</sup> <sub>8</sub>
10 <sup>7</sup> <sub>8</sub>	11 <sup>5</sup> <sub>16</sub>	11	11 <sup>11</sup> <sub>16</sub>	15S		78°	11	11 <sup>1</sup> <sub>2</sub>	11 <sup>3</sup> <sub>16</sub>	11 <sup>1</sup> <sub>2</sub>
11 <sup>3</sup> <sub>16</sub>	11 <sup>3</sup> <sub>4</sub>	10 <sup>15</sup> <sub>16</sub>	11 <sup>1</sup> <sub>2</sub>	13S		78°	11 <sup>3</sup> <sub>8</sub>	11 <sup>13</sup> <sub>16</sub>	10 <sup>15</sup> <sub>16</sub>	11 <sup>1</sup> <sub>2</sub>
10 <sup>7</sup> <sub>16</sub>	10 <sup>15</sup> <sub>16</sub>	10 <sup>5</sup> <sub>8</sub>	10 <sup>9</sup> <sub>16</sub>	11S		78°	10 <sup>1</sup> <sub>2</sub>	11	10 <sup>3</sup> <sub>4</sub>	10 <sup>3</sup> <sub>8</sub>
11 <sup>5</sup> <sub>8</sub>	12 <sup>15</sup> <sub>16</sub>	11 <sup>3</sup> <sub>8</sub>	11 <sup>1</sup> <sub>2</sub>	9S		51°	11 <sup>3</sup> <sub>4</sub>	13 <sup>1</sup> <sub>4</sub>	11 <sup>1</sup> <sub>2</sub>	11 <sup>1</sup> <sub>2</sub>
11 <sup>1</sup> <sub>8</sub>	12 <sup>15</sup> <sub>16</sub>	11	12 <sup>1</sup> <sub>4</sub>	7S		51°	11 <sup>1</sup> <sub>2</sub>	12	11 <sup>1</sup> <sub>4</sub>	12 <sup>1</sup> <sub>4</sub>
13 <sup>1</sup> <sub>16</sub>	11 <sup>1</sup> <sub>16</sub>	13 <sup>1</sup> <sub>8</sub>	11 <sup>1</sup> <sub>8</sub>	5S		53°	13 <sup>1</sup> <sub>8</sub>	11 <sup>1</sup> <sub>4</sub>	13 <sup>1</sup> <sub>4</sub>	11 <sup>1</sup> <sub>8</sub>
12 <sup>3</sup> <sub>8</sub>	11 <sup>3</sup> <sub>4</sub>	12 <sup>5</sup> <sub>8</sub>	11 <sup>5</sup> <sub>16</sub>	3S		53°	12 <sup>1</sup> <sub>4</sub>	12 <sup>1</sup> <sub>8</sub>	12 <sup>7</sup> <sub>8</sub>	11 <sup>1</sup> <sub>2</sub>
12 <sup>5</sup> <sub>8</sub>	11 <sup>1</sup> <sub>2</sub>	12 <sup>7</sup> <sub>8</sub>	11 <sup>3</sup> <sub>16</sub>	3N		48°	12 <sup>7</sup> <sub>8</sub>	11 <sup>3</sup> <sub>8</sub>	13 <sup>1</sup> <sub>4</sub>	11 <sup>1</sup> <sub>2</sub>
12	11 <sup>15</sup> <sub>16</sub>	12 <sup>1</sup> <sub>16</sub>	11 <sup>15</sup> <sub>16</sub>	4N		50°	12 <sup>1</sup> <sub>4</sub>	12	12 <sup>1</sup> <sub>8</sub>	11 <sup>1</sup> <sub>2</sub>
11 <sup>11</sup> <sub>16</sub>	12 <sup>5</sup> <sub>16</sub>	11 <sup>3</sup> <sub>4</sub>	12 <sup>1</sup> <sub>2</sub>	6N		50°	12	12 <sup>3</sup> <sub>8</sub>	11 <sup>7</sup> <sub>8</sub>	12 <sup>1</sup> <sub>2</sub>
-	12 <sup>5</sup> <sub>8</sub>	-	12 <sup>7</sup> <sub>8</sub>	7N		50°		12 <sup>11</sup> <sub>16</sub>		12 <sup>1</sup> <sub>2</sub>
11 <sup>1</sup> <sub>4</sub>	11 <sup>1</sup> <sub>8</sub>	11 <sup>1</sup> <sub>4</sub>	11 <sup>3</sup> <sub>16</sub>	9N		50°	11 <sup>1</sup> <sub>4</sub>	11 <sup>1</sup> <sub>4</sub>	11 <sup>5</sup> <sub>16</sub>	11 <sup>1</sup> <sub>2</sub>
11 <sup>5</sup> <sub>16</sub>	11 <sup>1</sup> <sub>4</sub>	11 <sup>1</sup> <sub>16</sub>	11	11N		50°	11 <sup>1</sup> <sub>4</sub>	11 <sup>1</sup> <sub>4</sub>	11 <sup>1</sup> <sub>16</sub>	11 <sup>1</sup> <sub>2</sub>
11 <sup>1</sup> <sub>4</sub>	11 <sup>1</sup> <sub>8</sub>	11 <sup>5</sup> <sub>16</sub>	11 <sup>3</sup> <sub>16</sub>	13N	1	49°	11 <sup>5</sup> <sub>16</sub>	11 <sup>3</sup> <sub>16</sub>	11 <sup>5</sup> <sub>16</sub>	11 <sup>1</sup> <sub>2</sub>
-	15 <sup>*</sup> <sub>8</sub>	-	15 <sup>*</sup> <sub>8</sub>	N.ABUT. <sup>*</sup>	OCT 79	48°		13 <sub>4</sub>		11 <sup>1</sup> <sub>2</sub>

CHESAPEAKE CITY BRIDGE  
BRIDGE INSPECTION REPORT

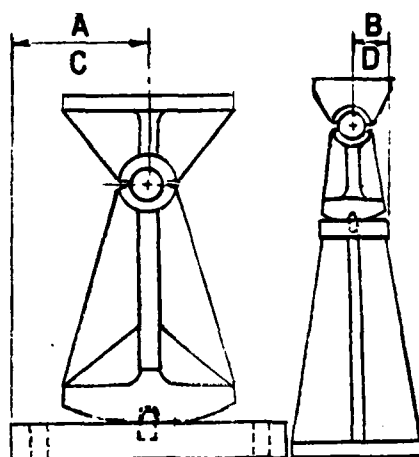
DRAWING 1-5

U.S. ARMY

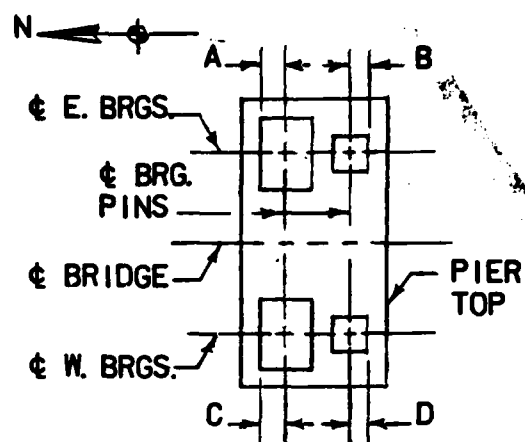
TANCES

C	D
15 <sub>16</sub>	
15 <sub>8</sub>	10 <sub>12</sub>
13 <sub>16</sub>	11 <sub>34</sub>
10 <sub>15</sub> <sub>16</sub>	11 <sub>58</sub>
10 <sub>34</sub>	10 <sub>11</sub> <sub>16</sub>
11 <sub>2</sub>	13
11 <sub>4</sub>	12 <sub>38</sub>
13 <sub>4</sub>	11 <sub>4</sub>
12 <sub>78</sub>	11 <sub>12</sub>
13 <sub>4</sub>	11 <sub>18</sub>
12 <sub>8</sub>	12
17 <sub>8</sub>	12 <sub>34</sub>
	12 <sub>12</sub>
15 <sub>16</sub>	11 <sub>14</sub>
11 <sub>16</sub>	11 <sub>16</sub>
15 <sub>16</sub>	11 <sub>38</sub>
	11 <sub>16</sub>

Y BRIDGE  
REPORT #118



PIER IS BEARINGS



PLAN BEARINGS

EXPANSION ROCKER BEARING ALIGNMENT MEASUREMENTS					
DATE	TEMP.	OFFSET DISTANCES (INCHES)			
		A	B	C	D
MAY 1973	74°	23 $\frac{7}{8}$	5 $\frac{5}{8}$	23	5 $\frac{1}{2}$
MAY 1975	77°	23 $\frac{7}{8}$	6 $\frac{7}{8}$	23 $\frac{7}{8}$	6 $\frac{15}{16}$
OCT. 1979	48°	23 $\frac{3}{4}$	6 $\frac{5}{8}$	23 $\frac{5}{8}$	6 $\frac{3}{4}$

CHESAPEAKE CITY BRIDGE  
BRIDGE INSPECTION REPORT # 118

# STRUCTURE INVENTORY & APPRAISAL SHEET

Revised 4-71

IDENTIFICATION		CLASSIFICATION		By		Date	
1 State	Maryland - 242	20 Fed Aid System	03	Transfer of Data			
2 Hwy District	02	21 Administrative	2	Maintenance Insp.			
3 County	Cecil 08	22 Functional	02	Condition Analysis			
4 City/Town	Chesapeake			Appraisal			
5 Inventory Route	121002130			Cost Estimate			
6 Features Intersected	C & D Canal			General Review			
7 Facility Carried by Structure	U.S. 213						
8 Structure No.	1	STRUCTURE DATA		23 Type Service			
9 Location	14mi. W of Reedy Pt.	24 Year Built	4900	25 Structure Type - Main		Steel Tied 3 1 2	
10 Milepoint	01340	26 Lanes on Str	02 under 00	26 Approach		Girder flbm 3 0 3	
11 Road Section No.	194	27 ADT on Str	008000	27 No of Spans - Main		1 001	
12 Defense Bridge Letter	E	28 Design Load	4	28 Approach		32 0032	
13 Defense Milepoint	30.65 00307	29 Appr Rdwy Width W/Sl'd	025	29 Max Span Length		0540 540	
14 Defense Section Length	36.05 361	30 Br Median	00	30 Structure Length		003954 3954	
15 Latitude	39° 31.8' 39318	31 Skew	00	31 Sidewalk		000040 4 0 ft Lt 0	
16 Longitude	75° 48.9' 075489	32 Structure Flared	Yes No	32 Br Roadway Width (curb-curb)		0250 25 0	
17 Physical Vulnerability	3	33 Navigation Control	Yes No	33 Deck Width (out-out)		0300 30 0	
18 By-pass, Detour Length	10	34 Vertical	135	34 Vert Clearance over Deck		1806 18' 6"	
19 Toll Bridge	On Toll Road On Free Road	35 Horizontal	0450	35 Underclearance - Vertical		0000	
20 Custodian	U.S.A. CofE5	36 Wearing Surface		36 Lateral-Right		999 N/A	
21 Owner	U.S.A. CofE5			36 Lateral-Left		N/A	
22 FAP No							
CONDITION		Material		Condition Analysis		Rating	
37 Deck	Concrete	Structural Steel		Good Condition		8	
38 Superstructure	Concrete	Concrete		Good Cond.-Minor Spalls&Cracks		7	
39 Substructure	Rip Rap	Rip Rap		Good Condition		8	
40 Channel & Channel Protection						N	
41 Culvert & Retaining Walls						8	
42 Estimated Remaining Life	55	Approach Roadway Alignment		Good Cond.		8	
43 Operating Rating	250	Inventory Rating		234			
APPRAISAL		Deficiencies				Rating	
44 Structural Condition		5% grade on approach spans				5	
45 Deck Geometry						8	
46 Underclearances-Vertical & Lateral						8	
47 Safe Load Capacity						8	
48 Waterway Adequacy						8	
49 Approach Roadway Alignment						6	
PROPOSED IMPROVEMENTS		Completed		Describe (Item #)			
50 Year Needed							
51 Type of Service							
52 Type of Work							
53 Improvement Length		ft					
54 Design Loading							
55 Roadway Width		ft					
56 Number of Lanes				Prop Rdwy Improvement-Year			
57 ADT		Year		Type			
COST OF IMPROVEMENTS						\$ , , 000.	
Remarks		*Clean and paint rusted steel under joints and repair drainage baffles.					